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Nutrition&
Metabolism

Abstracts of
the Asian Congress of
Nutrition 2019

Nutrition and Food Innovation
for Sustained Well-Being

Bali, Indonesia, August 4–7, 2019

Guest Editors
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Plenary Session

1
Nutriomics Applications for Precision Nutrition in Obesity

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Keywords: Metabolomics · Microbiota · Nutritional genomics · Personalized nutrition

Precision nutrition is an emerging health endeavour, which implicates information collecting about the genetic/epigenetic background of the person, as well as gender, age, phenotype features, clinical history and individual physiopathological conditions and related lifestyle factors associated to nutritional wellbeing. Advances in "omics" technologies are contributing to a better knowledge of the interplay among environmental facets and genetic polymorphisms (genomics), epigenetic signatures (epigenomics) or gene expression patterns (transcriptomics) as well as metabolite concentrations changes in urine and blood (metabolomics) and the microorganisms composition on the gut (metagenomics) that are affecting in the onset and development of non-communicable chronic diseases and complications associated with obesity such as hyperglycaemia, hypertension and dislipemia, and the way these relationships can influence therapeutic responses. The scientific progress in the different "omics" sciences are permitting the design of individualized customized approaches and clinical management on precision nutrition for personalized health maintenance as well as for the prevention and treatment of metabolic diseases at global level.

2
Food Innovation for High Value-Added Food Products and Well-Being Using World's Cutting-Edge Technologies

Teruo Miyazawa[a,b]

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Keywords: Food innovation · Food product · Longevity · Physiological functions

The United Nations estimate that the world population will be approximately 9,500,000,000 in 30 years and 5,000,000,000 people, which is more than half of the world population, will reside in Asia. Regardless of the number of the people on earth, all the human beings should be able to enjoy the longevity while they pursue their dreams and goals of their lives. This is something that makes people happy. The human body is constructed with the food we eat. The nutrients taken in your body will even alter the gene expression epigenetically and contribute to the longevity. We should not count too much on the expensive medicine. We need to reveal more in details the inherent functions of the local food that is consumed in a certain region and a country and find out how it contributes to the longevity of the people there. In order to analyze the components of food and human body at the levels of molecular species or isomers, we need to be equipped with cutting edge analyzing devices. It is expected that the Quantum Computation is also utilized for the analyses of the physiological functions when multimolecular species are taken in as food. In this lecture, my talk will be focused on the "Food Innovation for High Value-added Food Products and Well-being Using World's Cutting-edge Technologies".

3

Accelerating the End of Hunger and Malnutrition

Martin Bloem[a,b]

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Keywords: Hunger · Malnutrition · Underweight · Food system

The burden of malnutrition across the world remains very high with slight improvement. Children under-five years of age face multiple burdens: 150.8 million are stunted, 50.5 million are wasted and 38.3 million are overweight. Meanwhile 20 million babies are born of low birth weight each year. Overweight and obesity among adults are at record levels with 38.9% of adults overweight and increasing among adolescents. Women have a higher to certain forms of malnutrition: one third of all women of reproductive age have anemia and women have a higher prevalence of obesity. Millions of women are still underweight. It shows that we are not on track to achieve Global Nutrition Target 2025 as set by World Health Assembly (WHA) and by 2030- the target year for the SDGs. A significant push to fast-track efforts to end hunger and malnutrition are needed. There are many important scientific discovery need to be communicated and implemented to solve the food systems problem better and faster, regardless of politics, culture, eating patterns and value chain dynamics. By introducing and positioning scientific discoveries and evidence, social marketing should go hand in hand, to effect positive change. Lessons learned could be shared and recommended to the rest of the world, through scientific publications as well as through a variety of communication channels.

4

Accelerating the End of Hunger and Malnutrition – Sharing Indonesia Experience

Subandi[a]

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Keywords: Hunger · Malnutrition · Indonesia experience · Underweight

It shows that we are not on track to achieve Global Nutrition Target 2025 as set by World Health Assembly (WHA) and by 2030- the target year for the SDG. A significant push to fast-track efforts to end hunger and malnutrition are needed. In the last 5 years, Indonesia nutrition situation showed a good improvement. Indonesia Basic Health Research (RISKESDAS) 2018 unveiled some improvement of stunting level under 5 years old, to 30.8% from previously 37.2% in 2013. Prevalence of underweight and stunting also decreasing, in line with the report of Global Nutrition Report (GNR) 2018. However, this level is still very much high considering every year there are around 5 million newborn babies in Indonesia and the figures are still above the safety threshold of WHO 2010. Hidden hunger due to micronutrient development are looming due to the increase of anemia for pregnant women from 37.1% to 48.9% in 2018; also prevalence of obesity above 18 years, confirming that Indonesia is still facing triple burden. The journey of Scaling Up Nutrition (SUN) Movement Indonesia from having highest political commitment, multi stakeholder approach for impact will be shared. To make much faster progress, it is needed to identify accelerators of food system change to be contributed by all stakeholders to achieve National Nutrition Strategy. The transformative change in policy, communication, education, behavior communication change for accelerating reduction of hunger and malnutrition. Stunting drives to 160 regencies-1600 villages, embracing multi stakeholders through SDGs and revisit fortifications drives are expected to help the acceleration.

5

Accelerating the End of Hunger/Malnutrition Sharing of Private Sectors

Axton Salim[a]

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Keywords: Malnutrition · Hunger · Food innovation

Assessment of nutrition are moving in the wrong direction based on 2018 Global Nutrition Report. The multiple burdens for children under five years of age: 150.8 million are stunted, 50.5 million are wasted and 38.3 million are overweight. Meanwhile, 20 million babies are born of low birth weight each year. Overweight and obesity among adults at record levels with 38.9% of adults overweight and increasing among adolescents. Women have a higher prevalence of obesity. UN's Scaling Up Nutrition Movement (SUN Movement) enables the Business Network (SBN) to mobilize private sectors to support its respective to scale up nutrition based on the National Nutrition Strategies. Implementation of large scale food fortifications, nutrition for workforce, contributed to improved nutrition. The latest version of teenage interactive adolescent nutrition education using mobile platform actionable ideas to scale innovative mechanisms to support the local SM investment options to improve impacts, commercial investments in nutrition through SMEs, to help break the endless cycle of malnutrition and poverty will be shared. Amongst other are Africa Nutrition Investors The Forum in Nairobi was initiated by SBN and supported by DSM in Nairobi – Kenya and Indofood Local Elevation Pitch supported by – SBN and GAIN. The SBN intent to do more pitch forum and competition in 2019/2020 to embrace more private sectors in Asia.

6

Innovations in Bioavailability of Nutrients for Health and Wellness using Traditional Foods and Modern Tools

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Keyword: Health · Traditional food · Modern tools · Bioavailability

The knowledge of traditional foods in each country has in its storage of databases around the globe and would probably is unlimited in knowledge and more to learn from each other. In this world of hunger and diseases pervading across and perhaps here is a tool that is neglected over time and today it is coming back in a very different entry – from the pharmacy angel, from the functional food angle, from the nutraceutical angle, from a diet angle and also from a healthy living lifestyle angle of NUTRITION agenda. The epidemiological data on Nutritious food habits in several regions of population globally which directly can be related to the benefits of their quality of life is clear from a Nutrition point of view. There are many challenges in terms of its bioavailaility, in terms of its bioaccesibility due to the presence of other components with which it can form complexes and inhibit the bioactivity molecules. This makes the nutrients more bioavailable to us in its needed concentration that is added so that we consume less of it for more sustaining health benefits. The modern tools helps us to use them, monitor them, measure them and understand their interactions with the body thus giving us the wonderful opportunity in the modern world through chemistry in understanding the bioavailability more than ever before.

7

Fasting Diet and Autophagy: Should We Consider How We Eat and When We Eat For Healthier and Longer Life?

Hardinsyah Hardinsyah[a,b]

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Keywords: Authophagy, Healthier life, How we ate, Longer life, When we eat

A previous review on obesity reveals that there is no country globally has been significantly success in lowering obesity, that is one of the risk factors for NCDs. NCDs were responsible for 71% the world's deaths, in which about one-third of these deaths were among productive age. Hundreds of diets were promoted to reduce obesity and NCDs rates but focus mainly on types of food, amount of food to be consumed, as well as physical activity. Most of country's dietary guidelines in the world are also still focus on that suggestions. Current evidence showed that to be healthier and longer life is required an increase in authophagy, and a decrease in each of the four ageing factors - DNA damage, glycation, telomeres shortening and free radical activity. Each of the four ageing factors is affected not only by what types of food we eat, how much the food we eat, and how we move, but also affected by how we consume, when we consume, and how we sleep, think and feel. It is the time now to consider to include strategies and messages on how we consume and when we consume in the promotion of diets for controlling adults obesity and NCDs in appropriate manner, as well as in the future dietary guidelines.

8

Rising Obesity in Asia: What Can We Do in Public Health Setting?

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Keywords: Public health · Obesity · Policy

Over the last three decades many evidence-based policy recommendation to prevent the rise in obesity rates have been endorsed by WHO member states however no country has successfully reversed its epidemic. The current "obesogenic" environment is characterized by the coexistence of over-nutrition and low levels of physical activity with overweight and obesity commonplace at all stages of the lifespan. Based on recent findings, links between under-nutrition and obesity appear to be strong, both occurring together and in the same low income households in many parts of Asia. It is also becoming more apparent that the traditional approach appears to have failed in producing the desired effect judging from the increasing trend in prevalence of obesity within the last decades. Changes of the energy density of foods and diets have been implicated in the rising trends of overweight and obesity suggests an urgent need to review dietary recommendation. If increasing obesity rates are to be tackled, stricter regulatory environment/legislation among stakeholders seems inevitable. The actions to act decisively to help combat obesity in Asia has been few and overall rather uncoordinated. The present crisis underscores the urgent need to improve the "obesogenic" environment we live systematically and sustainably. The Lancet Commission (2019) recommends comprehensive actions to address obesity within the context of The Global Syndemic. Unless we could make policy makers, industry and professionals alike understand the threat obesity poses and the urgency to implement possible solutions now, the natural course would be an obesity epidemic in Asia that will continue to grow beyond control in the coming decades.

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[c]Zhejiang University, China

Keywords: Randomized controlled trial · Macronutrents · Obesity · Non-communicable diseases

The aim of the six-month randomized controlled-feeding trial was to investigate whether the traditional lower fat, higher carbohydrate diet (fat 20%E , carbohydrate 66%E) is more effective than the higher fat, lower carbohydrate diet (fat 40%E, carbohydrate 46%E) at preventing obesity among a non-obese healthy population (aged 18–35 years, BMI<28) in China. Protein provided 14%E in all diets. Reduction in body weight was significantly greater in the lower fat, higher carbohydrate group throughout the intervention. Reductions in waist circumference, total cholesterol, lower-density lipoprotein cholesterol, non-higher-density lipoprotein cholesterol and apolipoprotein B on the lower fat, higher carbohydrate group were greater than those observed on the other two diets groups. The higher-fat diet resulted in an elevated concentration of total BAs, and unconjugated bile acid (BAs) compared with lower fat diet. Secondary BAs, such as deoxycholic acid, taurodeoxycholic acid, 12-ketolithocholic acid, 3β-DCA and taurolithocholic acid were significantly increased in the higher-fat diet group after the 6-month intervention. The lower-fat diet was associated with increased α-diversity assessed by the Shannon index, increased abundance of *Blautia* and *Faecalibacterium*, whereas the higher-fat diet was associated with increased *Alistipes* and *Bacteroides*, and decreased *Faecalibacterium*. The concentration of total short chain fatty acids was significantly decreased in the higher- fat diet group when compared with other groups. The co-metabolites p-cresol and indole known to be associated with host metabolic disorders, were decreased in the lower-fat diet group. In addition, the higher-fat diet was associated with faecal enrichment in arachidonic acid and lipopolysaccharide biosynthesis pathway as well as plasma proinflammatory factors after the intervention. (Clinical-Trials.gov NCT02355795.)

Muhammad Rizal Martua Damanik[a]

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Keywords: Nutritional status · SDGs · Family · Family planning

As poverty and hunger listed number one for SDGs agenda 2030, many research have attempted to identify the correlation of this variable with adequate nutrition intake both quantitatively and qualitatively. Several research have proven the direct association between stunting children (growth failure) to the younger age at first marriage of their mothers, due to both lack of knowledge and experience to raise children, and also lack of economic factors triggered by early marriage. One major requisite to demographic dividend that currently occurs in Indonesia since 2012 and is predicted to reach its window of opportunity by year 2028 is the success in Family Planning program. Multiple advantages when women manage to control upon their fertility and have bargain power in deciding number of their children desired, are prone to have healthier children with better nutritional status, women also have more time to earn income for their families, and entering labour market. Subsequently, the community are also benefited to earn public savings as well as family income. By this stage, the nation successes to improve its human development index (HDI) which examines three major variables: health, education and economic status of women, as well as country success to reduce poverty and hunger as mandated by SDGs agenda 2030. Further, other goals of 2030 will also be achieved, such as maternal health, education, women empowerment, etc. Within Family Planning program, one also can learn how to nurture children growth and development. BKKBN as the one and only mandatory Government institution in Indonesia, is responsible to manage population size through family planning and family development. BKKBN has a long history in empowering community group activities involving parents as the entry point, such as: family groups with children (or BKB), family groups with adolescents (or BKR), and family groups with elderly (or BKL) which basically educating society at family level on how to deal with those segmented groups. Especially in the BKR activities, a strong innovation to improve children nutritional status is highlighted to combat stunting cases, through additional dietary intake for children (or PMT), monitoring for children growth and development, early initiation of exclusive breastfeeding (or IMD), and nutritional counseling for mothers delivered by Family Planning Field Workers. Stunting issue has been currently contested among national top priority as raising concerns for the long run impacts from severe malnutrition cases which affected brain damage of the children, leading to sub-ordinate quality of human resources, while Indonesia is currently entering demographic dividend.

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Keywords: Precision health · Molecular tools · Metabolic risk

The potential for transforming nutritional and health research through the application and implementation of non-invasive markers of metabolic status is profound. Integration of genetics, (epi)genomics, proteins and metabolites from physiological process provides a "window into the body", are transforming how to measure health, how to identify and monitor people most at risk of disease and the way to monitor food intake. Coupled with tools utilising sensor technology to enable ecological momentary assessment, a new horizon of research in which indicators of metabolic risk and indicators of dietary intake could be collected at a popula-

tion level with unprecedented simplicity and low cost. Through the validation of state-of-the-art molecular tools for measuring health synergistically identifying, how nutrients, supplements or dietary patterns impact these markers, we can optimise health of individuals from diverse genetic backgrounds. This paper discuss the outcomes from a study designed to understand the influence of amylase copy number on weight trajectories and glycaemic control; introduce CSIROs Precision Health Future Science Platform and discuss how Precision Health will transform the way to manage our health by five staeps. First, changing the emphasis from treating illness to keeping people healthy by better predicting, and delaying, the on-set of chronic disease; second, adopting a wider view of health to include genomics, gut microbiome, environmental, behavioural and social factors; third, integrating data to deliver insights through predictive data platforms; foutrh, moving from a 'one-sized-fits all' trial and error to more effective, personalised solutions to keep people healthy; fifth, shifting from a provider centric to consumer centric model supported by digital tools to help people track their health status and make better decisions.

12
CODEX Standards Development: Global Collaboration to Ensure Safe and Nutritious Food for Better Health

Purwiyatno Hariyadi[a]

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Keywords: Safe food · Nutritious food · Food supply · Food trade

The emergence of global food trade, has contributed not only to increasing the availability and diversification of food throughout the world, but also has increased global concern for food safety and nutrition. Global food trade has made food produced in one country potentially affect the diet, health and nutrition of people living in other countries. As a result, there is a need to develop harmonious standards, guidelines and codes of practice to ensure better food safety and nutrition globally. The Codex Alimentarius Commission (CAC), founded in 1963 by the United Nations Food and Agriculture Organization (FAO) and the World Health Organization (WHO), has been tasked to play a specific role in developing international standards (including guidelines and codes of practice). These texts are usually related to hygienic practices, labeling, nutrients, additives, contaminants, and residues of veterinary medicines and pesticides. In particular, CAC has a responsibility to identify issues that might require internationally harmonized standards for new safety, nutrition and food innovations, and provide a forum for global collaboration towards safer and more nutritious foods for more health. This presentation will provide an overview of the use of risk analysis principles from the Codex standard development process and consensus must be based on the principles of scientific analysis and strong evidence, involving thorough review of all member countries and observers. This collaborative process allows Codex standards to be used as valuable references not only to ensure a safer and more nutritious (global) food supply, but also for fair international food trade.

Lunch Symposium Session

13
Improvement of Dietary Diversity Measured by Take10!® Check Sheet after Healthy Menu Implementation in the Workplace

Rimbawan Rimbawan[a]*, Reisi Nurdiani*[a]*, Anna V. R. Mauludyani*[a]*, Karina R. Ekawidyani* [a]*, Mika Kimura*[b]*, Yasu Toride*[b]

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Keywords: Employee · Healthy eating behavior · Nutritional status · Vegetables consumption

Basic Health Research 2018 in Indonesia revealed an increase in prevalence of overweight and degenerative diseases in productive age group. Workplace could be an alternative food intervention place. This study was aimed to evaluate the impact of healthy menu on dietary diversity among employee of PT Murakami Delloyd Indonesia (MDI), Cikarang. This experimental study includes 103 employees. The study collected data on characteristics of subject and dietary diversity which was measured twice by modified Take10!® Check Sheet. Take10!® Check Sheet includes 10 food groups i.e. meat, fish, egg, milk and its products, nuts and beans, soybean and its products, green leafy vegetables, other vegetables, fruits and tubers. Dietary diversity difference before and after menu modification was analyzed using paired t-test. Most subjects were aged between 20 and 39 years, male (63.4%) and belonged to Sundanese ethnicity (51.7%). More than half of subjects (57.5%) had high BMI, consisting of 17.7% overweight and 39.8% obese. Almost half of subjects had central obesity (44.2%). The mean Take10!® score in the baseline was 4.79 and significantly improved to 5.84 after the menu was modified. The biggest increment was found for group of other vegetables which improved by 0.30 points, followed by green leafy vegetables (0.27 points). The healthy menu was characterized by high vegetables and fruits, low fat, and high food diversity. The improvement in dietary diversity after healthy menu implementation suggests that food intervention in the workplace could contribute to healthy eating behavior that will lead to improvement of nutritional and health status.

14

Introduction of Fortified Rice into the Canteen for Cambodian Female Workers

Yukiko Nakanishi[a], Yasuhiko Toride[a], Mika Kimura[a], Ai Moriyasu[a], Sol Sowath[b], Theary Chan[b]

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Keywords: Employee, rice fortification, canteen, folic acid, presenteeism

Background: Although the prevalence of anemia was as high as 43.6% (Cambodia health Survey 2014), the contribution rate due to dietary iron deficiency was low, suggesting the contribution of folic acid deficiency and zinc deficiency. The folic acid deficiency (<10 nmol/L) was 17.8%, and the zinc deficiency was 26.3% in the case of <7.65 ?mol/L. Whitfield et.al, reported that women with thiamine deficiency (TDP ≤90 nmol/L) were 39% in urban areas and 59% in rural areas. In this study, we evaluated the effect of improving nutrition by introducing multi-micronutrients-fortified rice (MMFR) in the cafeteria, for female employees of reproductive age who work at factories, in Cambodia. **Methods:** Fortification levels was set based on WHO-WFP-DSM recommendation as followings. Micronutrients fortification levels were 0.169 mg/100 g of folic acid, 6.0 mg/100 g of Zinc, and 0.65 mg/100 g of VB1 when the premix is mixed with the ordinary rice as 1: 200. Study subjects were recruited from reproductive aged women working for Japanese-Cambodian electronic parts factory. One hundred and eighty female workers were randomly selected and divided into two groups as a control group with 90 subjects and a fortified group with 90 subjects. The double blinded intervention study was conducted for 12 weeks from November, 2018 to February, 2019. Questionnaire for Subjective health and heath complaints, and blood analysis were examined. **Results:** By introducing fortified rice into the canteen, serum folate concentration increased in proportion to the frequency of intake of fortified rice in the intervention group and significantly improved. In addition, the loss due to the decline in absolute presenteeism was improved. **Conclusion:** The possibility of reducing the risk of neural tube closure failure in neonates was shown. Further study is needed to disseminate Cambodia TAKE 10! Check sheets for health education and food diversity.

15

Nutrition for Workforce in Indonesia: Case Study of Nutrifood

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Keywords: Wellness program · Nutrition for workforce · Employee wellbeing

The workplace plays an important part in combating the rise of chronic disease and promoting healthy lifestyle. Workplace can affect the wellbeing of workers and therefore offers opportunities to improve worker's health. Companies have begun to pay more attention to employee wellness, such as in Singapore 60% or 3 out of 5 companies investing wellness program for their employee. Although there is no data yet in Indonesia, one of the sources that can be tracked is through employee health activities of *SBN (Scale Up Nutrition Business Network)* whose goal is to accelerate achievement of Sustainable development goals in Indonesia. This study explains various activities of employee wellness through nutrition for workforce in Indonesia from Nutrifood, one of SBN member from 2016–2019. The program focuses on nutrition prevention toward the outcomes of overly high sugar, fat, and salt intake, in line with company's mission as healthy food producer. Employee wellness coordinated by in-house dedicated department, the outcomes was evaluated by health index, besides being compared with National health data. Study shows the betterment of health index, although there is still some improvement needed in the future. Some of the key success of the program are, top management supports, evidence-based program design, and ability to adapt with current situation, such as trend and technology. There is still limited data to identify the effectiveness of employee wellness program in Indonesia. This case study can be learnt by companies. Employee wellness programs need to be intensified, although the result cannot be observed in a short period of time and may be a long-term investment of the company.

16

Nutrition Education for Community: From Program to Implementation

Hera Nurlita[a], Doddy Izwardy[a], Dyah Yuniar Setuawaty[a], Suroto Suroto[a]

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Keywords: Food supplementation · Indonesian children · Local food · Nutrition education

Chronic undernutrition is still prevalent among children under five years old. Special program of government was designed to address this problem through nutrition education and local food supplementation (NELS) to mothers, include pregnant women, and children under five years old. This study revealed the results of the qualitative evaluation of the NELS program. The evaluation was done qualitatively by the MOH staffs who were assigned to be the evaluators and not involved in the implementation of the NELS. The results showed that, the NELS program was implemented in 130 villages of 13 districts and 11 provinces of Indonesia in 2018. Most mothers attended and received nutrition education delivered by nutrition cadres. All children received local food supplementation through their mothers as expected. Mother expressed some challanges and barriers in preparing food for children such as time for cooking, and local food availability. They assumed provision of meals for children should be different from family meals, and need more time. The good thing was they realized that variety of foods, consistence and active feeding is important for infant and young children feeding (IYCF). Most of cadres said that additional information on the IYCF concept and balanced diet for children is needed by mothers to solve their children

nutrition problems. In conclusion, the NELS program was run as planned but required to be more frequent and quality information from cadres to mothers as well as to empower mothers on IYCF practices that could contribute to develop a more effective and sustainable future intervention of NELS.

17

Rebranding Tempe from Traditional Food to be More Acceptable for the 21st Century Consumers

Made Astawan[a,b], Dadi Hidayat Maskar[c,d]

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Keywords: Tempe · Traditional food · Rebranding · Indonesian food

Tempe is an Indonesian traditional food widely known and consumed across generations. As a functional food, tempe has various nutritional and health benefits, as published in many scientific journals. According to The National Economic Survey (Survei Ekonomi Nasional/Susenas) 2009, tempe, tofu and sweet soy sauce were consumed by 69.89%, 63.72% and 42.5% of households in Indonesia respectively, indicating an overall high consumption. This is especially so for tempe, where an average 30 gr/person of daily consumption was reported (Statistics Indonesia, 2014). Furthermore, the potential market for tempe is not for domestic only, there is a great opportunity for regional and international market. Currently, majority of the tempe consumed are produced by household-level small industries, a unique feature in Indonesia. There are several challenges faced by the Small and Medium-scale (SMEs) Tempe Industries in Indonesia. Among one of the key challenge is food safety issues due to limited knowledge of the producers on principles of food safety, hygiene and sanitation in their tempe production. The Indonesia Tempe Forum (FTI) is a non-profit organization was established in 2008 with mission to improve world public understanding on tempe as a main commodity in health and business perspective. Some of the highlight activities that have been carried out by the ITF in the framework of rebranding tempe: (1) established of *Rumah Tempe Indonesia* as a centre of excellence for tempe production through the application of Good Manufacturing Practices, (2) introduced products' diversification which are more attractive and have longer shelf life, (3) disseminated of researches results about tempe's health beneficial effect through academic meetings, (4) conducted tempe culinary demo and cooking competition for women's groups and high school students, (5) facilitated researchers from both Indonesia and foreign countries who are willing to comprehensively study and observe cases about tempe, (6) disseminated Indonesian National Standard and Regional Standard for Tempe (CODEX STAN 313R-2013) to the producers, (7) determined 6th June as an "National Tempe Day", (8) initiated the establishment of *TempeLand* as the first and the only edutainment that delivers messages and information about tempe in an informative and interactive way, (9) proposed tempe as an intangible cultural heritage of humanity to UNESCO. With all of those various activities, tempe and its de-

rivative products will have a better image in society, especially for generations of millenials. Continuing support and partnership need to be maintained to carried out ITF program and activities for the improvement of tempe industry in Indonesia. Tempe and its derivative products have great opportunity to be one of the national pride product for the international market.

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Soyfoods and Health: Examining Proposed Benefits of Issues of Concern

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Keywords: Soyfood · Plant-based diets · Soy protein

Governmental agencies and health organizations are increasingly recommending the consumption of plant-based diets for health and environmental reasons. The public has responded by expressing interest in consuming more plant protein. These developments bode well for soy protein as it has long been considered the quintessential plant protein. However, soy has not participated in the recent plant-based-product boom to the extent one might have expected based on the ongoing change in consumer food preferences as it has faced increased competition and there exists confusion about its health attributes. The proposed benefits of soyfoods, such as the hypocholesterolemic effect of soy protein, have been challenged and concerns raised about possible adverse effects, such as an increased breast cancer risk. This presentation will evaluate evidence in support of benefits as well as safety concerns. When available, conclusions of independent organizations will be cited, such as the European Food Safety Authority, the US Food and Drug Administration and the American Cancer Society. Among others, benefits to be discussed include breast cancer prevention, menopause symptom relief and cholesterol reduction whereas concerns to be addressed include effects of soy on thyroid function and the prognosis of breast cancer patients and on the risk of developing gout. In addition, new data on the prevalence of soy protein allergy will be presented as will research showing soy protein leads to similar gains as milk and whey protein in lean tissue and strength in individuals engaged in resistance exercise training. Finally, soy intake recommendations will be made.

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Establishment of the Indonesia Soyfood and Beverages Network (SoyBeaN Indonesia)

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Keywords: Soybean · Network · Collaboration · Health · Functional food

Soybean can be considered as functional food because it's potential health benefits. Consumption of soy food and beverage will improve the nutritional status of Indonesian people. Unfortunately, currently consumption of soy-based food and beverage, beside tempe and tahu, is still low. Even, there is a potential market for other soy-based products. For this reason, stakeholders of soybean Indonesia have inititated establishment of Indonesia Soy Food and Beverage Indonesia or SoyBeaN Indonesia. Vision of SoyBean Indonesia is becoming an innovative and insipirational organization in developing business and soy based products to increase consumption and nutritional status through improving business climate, food quality and safety, added value, and acceptance of soy-based food and beverage in Indonesia. Mission of SoyBean Indonesia are 1) Support the improvement of Indonesia's human resources through balanced nutrition patterns, where consumption of soy-based products are included; 2) Support innovation and research activities, as well as efforts to improve the quality and safety of soy-based food and beverage products; 3) Support the development of the soy-based food and beverage industries in Indonesia, both large, medium and small and micro-scale industries;4) Bridging research activities and outspread research results between universities, research institutions, and industries or other related parties; 5) Conducting public education and advocacy activities for stakeholders to support the business development of soybean-based food and beverage product; and 6)Facilitating communication, collaboration and friendship between stakeholders of soy based food and beverage products in Indonesia

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Childhood Obesity in China: Challenges and Opportunities

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Keywords: Obesity · Childhood · Intervention · Cost-benefit
Background/Aims: Along with the rapid transitions in social economic development and lifestyle, obesity in China showed an astonishing growing trend over the past 30 years. The prevalence of overweight and obesity were low in the 1980s. However, it has begun to be epidemic since the 1990s, especially among urban children. The epidemics of obesity has continued to rise in the 21st century. In 2014, the overall prevalence of obesity among children aged 7–18 years was 16.4% for urban children, 12.8% for rural counterparts. If there is no intervention being taken, the prevalence of obesity would reach 28.0%. The increasing of childhood obesity has led to the chronic diseases occurring in the younger age. Obesity has become a major risk factor for childhood cardiovascular disease and type 2 diabetes. Therefore, reducing the economic burden of chronic diseases through the prevention and control of childhood obesity is an urgent measure for China. Although the epidemic of childhood obesity in China started later than that in developed countries, it is urgent to aware that it is at the crucial stage of rapid growth now. It is the best time for prevention and control it. Comprehensive intervention could play a better prevention role on the control of development of childhood obesity with higher cost- benefit ratio.

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Addressing Critical Failures in Infant and Young Child Feeding in India

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Keywords: Infant · Breast feeding · Critical factor · Malnutrition

Optimal infant and young child feeding, which includes initiation of breastfeeding within one hour of birth, exclusive breastfeeding for first six months, age appropriate complementary feeding after six months along with continued breastfeeding for 2 years and beyond, is a public health intervention to prevent child morbidity, mortality and malnutrition. In India, even though institutional delivery rates are increasing, only 44% women are able to breastfeed their babies within one hour of delivery. While 65% children are exclusively breast fed for the first six months, the median duration of breastfeeding is 24.4 months and complementary feeding rates are 50%. Universalized access to community based infant and young child feeding counseling support system for each women is the key to optimal IYCF practices. Efforts, therefore, need to be made for upgrading skill based training of health workers and revive and update the Baby Friendly Hospital Initiative (BFHI). To promote and sustain breastfeeding amongst working

women, it is essential to ensure crèches at work place, flexible working hours, provision of physical space for breast feeding of children at work place. There is also a need for effective communication to create public awareness about the dangers and risks of bottle and formula feeding. There is a need to provide accurate information on the quality, quantity and frequency of complementary food to be given to infants. In conclusion, India needs to make serious efforts to overcome malnutrition with prioritized IYCF policies and their effective implementation in place.

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Dimensions of Food Environment Impacting Diet Diversity and Micronutrient Intakes in Middle-Income Households: A Mixed Methods Study in Rural South India

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Keywords: Food environment · Mixed methods · Diet diversity · Micronutrient adequacy · Micronutrient status

Background/Aims: Diet diversity, the key for micronutrient adequacy is impacted by many factors that determine food environment (FE). This study aimed to explore five dimensions of FE-availability, accessibility, affordability, accommodation and acceptability- and their influence on household diet diversity, micronutrient intake and status of children. **Methods:** This study was conducted in 4 randomly selected villages (>500 households) of Ghatkesar sub-district, Telangana State, South India employed mixed-methods approach with qualitative and quantitative components. Qualitative methods used- non-participant observation to assess store type; interviews (n = 16) with vendors to assess openness to accommodate new foods and focus-groups (n = 6) with mothers (n = 44) to assess perceptions on five dimensions of FE. The quantitative methods used–checklist (197-items) to assess availability, ARCGIS software to create geographic buffer-zones to assess accessibility, 24 h dietrecall (3 days) to assess intakes, standard methods to assess biomarkers (n = 6) of micronutrient status. **Results:** The wholesale (48)/retail (8) food-stores were accessible (<1 km) and accommodating 110 foods from 8 food groups. Availability of non-perishable foods throughout the year; green leafy vegetables seasonal; fruits and vegetables limited, seasonal and varied across villages. FGDs revealed most foods were affordable, accessible. Non-availability/seasonality of fruits, dislike for GLVs among children and food myths were hindering factors for consumption. Children residing in village near highway who consumed 5/13 food groups and 8/10 nutrients had better intakes and micronutrient status. **Conclusion:** The study helped identify contextual factors impacting the five dimensions of diet diversity, which should be considered along with individual factors like perceptions/practices for improving micronutrient status among households

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Renewing Multi-Sector Commitment to Address Childhood Stunting in Indonesia

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Keywords: Stunting · Childhood · Nutrition program

Over the last decades Indonesia has been experiencing an unfavorable progress in addressing childhood malnutrition. Indonesia is one of the nations that failed to meet the nutrition target of the 2015 MDGs. The global commitment such as WHA nutrition target 2025 and the 2030 SDGs targets have been evoking new enthusiasm of the Indonesia government to meet the global target. Indonesia has a long history in the nutrition program. Several progresses have been made among other in controlling the problem of micronutrient deficiencies such as Vita A and Iodine deficiencies. However, the problem of macro nutrition deficiency especially stunting and wasting are still very serious problems and has not shown a significant decline. Recent data shows that 30.8% of children under 5 years stunted and 10.2% wasted. The study of the implementation of nutrition programs concluded that; a) lack of integration in planning and budgeting, implementation, monitoring and evaluation of nutrition-specific and nutrition-sensitive interventions; b) Policies and programs in a variety of sectors do not prioritize interventions with proven cost effective; c) Resource allocation and utilization is not yet effective and efficient; d) Limited program implementer capacities as well as limited availability; e) In general, very low program coordination at various administrative levels. Localizing the global experiences and exploring the different best practices from different part of the districts, the government has set up a National Strategy to accelerate the improvement of childhood stunting. This Stranas consists of objectives, priority intervention, priority location, strategies, multi sector coordination and budgeting. The Stranas Stunting comprises of five pillars; 1) Leadership commitment and vision; 2) National campaign and behavior-change communication; 3) National, regional and village program convergence; 4) Food and nutrition security; and 5) Monitoring and evaluation.

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Inadequate Consumption of Fruit and Vegetable and High Sedentary Behavior Significantly Contribute to the Increasing Obesity in Indonesian Adult People

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Keywords: Obesity · Sedentary behaviors · Fruit and vegetable · Indonesia

Background/Aims: Sedentary behaviors and unhealthy diets are reported to be risk factors of obesity. This study aims to examine the role of high sedentary activity and low consumption of fruits and vegetables in increasing obesity in Indonesian adult people. **Method:** The analysis presented in this study was based on the data from a population-based, cross-sectional, nationally representative, Indonesian Basic Health Research 2013. In total, 222,650 men and 248,590 women aged 19–55 years were enrolled. A validated questionnaire, physical activity card, and food card were used for assessment. **Results:** The results showed that prevalence of obesity (body mass index of ≥ 27.5 kg/m^2) was higher in women (18.71%) than in men (8.67%). The prevalence was higher in those with high (≥ 6 hours/ day) sedentary activity (17.3%) than in those with low sedentary activity (14.5%). Furthermore, the prevalence was higher in those with low consumption of fruits and vegetables (20.6%) than in those with adequate consumption of fruits and vegetables (15.0%). Overall, people with high sedentary activity were 1.2 times (OR = 1.18, 95% CI: 1.16–1.21) more likely to be obese than those with low sedentary activity, and people with low consumption of fruits and vegetables were 1.5 times (OR = 1.51, 95% CI: 1.22–1.87) more likely to be obese than those with adequate consumption of fruits and vegetables after adjusting for age, sex, and socioeconomic status. The excess odds of being obese attributable to high sedentary activity and low consumption of fruits and vegetables was higher in men than in women. **Conclusions:** The present study suggests that promoting physical activity and healthy diets especially adequate consumption of fruits and vegetables could be the keys in preventing obesity in Indonesia.

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War on Diabetes in Singapore – "SNDA's Role in Supporting The Whole-of-Society Approach Towards Winning"

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Keywords: Diabete · Whole-of-society · SNDA

Can we win the war against diabetes in Singapore? Few nations are as resolute and focused as Singapore, in fight against diabetes. Are we closer to victory? What are the challenges faced? Will the initiatives/programmes be sustainable in the long run? The presentation will cover, the state of the war on Diabetes in Singapore, the initiatives taken on all fronts by the ministry to call for the public's attention to tackling the disease, with special emphasis on the role played by Singapore Nutrition & Dietetics Association (SNDA). SNDA, has been part of developing materials for the National Curriculum on Diabetes and other initiatives. SNDA members were also a part of the citizens jury, where their voice was heard with regards to nutrition and diet being the cornerstone in the prevention and management of diabetes. A multi-pronged, whole-of-society approach is needed, as diabetes is a complex metabolic disorder, which needs be tackled with solutions that are practical, prudent and forward-looking in order to effectively address systems-level gaps as well as initiate and support long-term individual behavioural and lifestyle changes.

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Protein and Amino Acid Requirement and Protein Quality Assessment of Foods For Children: Global Initiatives & Recent Developments

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Keywords: Protein · Amino acid · Children food

Protein quality assessment of foods measures the ability of food sources to meet the body needs for amino acids to support body functions such as protein synthesis and growth. Food sources however have a highly variable composition for essential and non-essential amino acids. While animal sources of protein have a balanced ratio of essential to non-essential amino acids, plant sources of protein tend to be low in some essential amino acids. Furthermore, not all amino acids that are present in foods are digestible and bioavailable. During childhood, periods of insufficient nutrient consumption lead to deficits in growth (linear or weight gain) that may be aggravated by periods of ill health. Provision of adequate amounts of protein from foods with a balance of essential and non-essential amino acids is key to reduce chronic outcomes such as stunting. Recently the United Nations Food and Agriculture Organization (FAO) has made an urgent call to develop methods to assess protein quality, especially in young children and a wide variety of plant proteins in order to ensure adequate dietary protein recommendations. This talk will provide updates on recent

state-of-the-art methods developed to assess protein quality and will summarize the current recommendation for protein and amino acids for 1–3 years children et during catch-up growth.

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Keywords: Nutrition education · Balance nutrition · Female teenagers · Rural area

Background/Aims: The development of an effective nutritional education model was very important because there has been orientation change from the knowledge improvement to behavioral aspects improvement. The objective of this study was to improve the knowledge and awareness of balance nutrition for female teenagers by using the "Education Food Base Dietary Guidelines Campaign for Teenagers and Young Adults. **Methods:** This study used the quasi-experimental method with pre-post-test design and no control group. This study was conducted in junior and senior high school (public school) in Ciampea, Bogor. This selected location represented rural areas. The inclusion criteria for the subjects of this study were female teenagers aged 13–18 years, able to communicate well, and were willing to take part in activities until finished. Subjects were selected using purposive sampling method. The nutrition education activities were carried out with the peer to peer education model. Peer educator was taken from each class with criteria: girls aged 13–18 years, have influence or active in youth organizations, able to communicate well, and willing to take part in activities until finished. The form of intervention activities carried out in this study included: educator workshops, mentoring nutrition educators, nutrition education through competitions (creative posters of teen nutrition education, creative videos of teen nutrition education, and creative videos of nutritional activity in adolescents).

Mia Srimiati[a], *Adhila Fayasari*[a], *Meylina Djafar*[a], *Isti Istianah*[a], *Hardinsyah Hardinsyah*[b], *Benny A Kodyat*[b], *Widjaja Loekito*[b]

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Keywords: Adolescent · Balanced nutrition · Knowledge · Physical activity

Background/Aims: Nutrition interventions in adolescent have two benefits, it is the last window of opportunity to improve nutritional problems in humans, and the second is an opportunity to prevent nutritional problems in the next generation. We studied the new style of nutrition education, this education carried out by the peer (peer nutrition education). **Methods:** Forty young female subjects from junior high school and high school students were given training regarding balanced nutrition to become nutrition educators for their peer. They must fulfill the inclusion criteria: aged 13–18 years, active in school organizations, able to communicate well and willing to follow interventions until the end of the program. Then the subjects were asked to provide peer education in a direct (face to face) or indirect way (social media, video, poster). There were 300 subject who received nutrition information from the educators. The study was conducted for 12 weeks. During the research, the nutrition educators followed the scheduled program from researcher. **Results:** The subjects who became educators increased knowledge of nutrition, improved diet, and physical activity (p > 0.05). However, on subjects who were only participants, only increased in nutrition knowledge. **Conclusion:** To improve nutritional behavior (diet and physical activity), adolescents should be given the trust to be role models not only to receive information in a passive way, but also they must be encouraged to disseminate that information.

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Keywords: Malnutrition · Micronutrient · NPANs

Double burden of malnutrition, characterised by high levels of stunting and wasting among children, micronutrient deficiencies, and coexisting overweight and obesity are the priority nutritional concerns in Southeast Asian (SEA) Countries. Poor dietary intakes (quantity and quality), poor infant and young child feeding practices and food insecurity are among the factors of the current nutrition situation in these countries. To alleviate the situation, the National Plans of Action for Nutrition (NPANs) in these countries prioritised the nutritionally vulnerable groups i.e. pregnant and lactating women, infants and young children. NPANs of these countries called for multi-sectoral and multi-stakeholder collabo-

ration to ensure more effective implementation of intervention strategies. Similar programmes and activities have been identified in the NPANs, among them ehnhancement of nutrition and food security; various approaches in dietary improvement; promotion of healthy nutrition during the first 1000 days of life; and nutrition education and promotion in schools. Countries have recognised that effective implementation, monitoring and evaluation are essential to successfully address both extremes of the challenging nutrition situation in SEA countries. Food-based dietary guidelines (FBDGs) have been formulated by SEA countries as basis for health and nutrition educational programmes. Common messages in FBDGs include recommending a varied diet rich in fruits and vegetables; choose foods low in salt, sugar and fat; include grains as the main source of energy; and consume sufficient milk and dairy products daily. Effective implementation of these guidelines are recognised as crucial to ensure sufficient understanding and greater adherence to the key messages by the community.

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A Review on Benefits of Milk and Animal Foods for Child Growth and Development

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Keywords: Milk benefits, animal foods, child growth, child development

Background/Aims: Healthy growth and development of children influence the later success of children in school and general well-bring later in life. Food is one of the factors that may effect on growth and development of children. This review was intended to reveal the benefits of milk and animal food for child growth and development. **Methods:** The review was done through a broad search in Medline, Scopus, Cochrane library database, web of science databases, google search to identify relevant studies in the peer-reviewed scientific literature related to health benefits of milk, and health benefits of animal food (meat, fish, and egg), include journal article English and in Indonesian among children 1–12 yrs old. **Results:** Studies on the benefits of milk on children growth showed that, intake of one to two glasses of milk among children improve their linear growth or body height significantly. Giving an egg every day for several months consumed by children increased their linear growth and reduced the prevalence of stunting. A portion of fish and meat intake for several months improve the development score of the children. **Conclusions:** Intake of one to two glasses of milk as well as an intake of one egg a day positively effects linear growth (body height) of the children. Intake of fish and meat increased child development score. This implies that milk and animal foods, as part of balance diet had beneficial effect on linear growth and development of children.

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Omic-Based Studies for Precision Nutrition in Chinese

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Keyword: Omic-based · Precision Nutrition · Earlier prediction · Prevention

With the rapid development of advanced metabolomic technology, omics-based biomarkers are expected to be used for earlier prediction and prevention of cardiometabolic disease, as well as nutritional studies. However, limited prospective studies have systematically investigated major nutritional and genetic factors on metabolic disease in Chinese. Thus, utilizing multiple omics approaches in a 6-yr population-based cohort study and also leading a national genome-wide association study (GWAS) for type 2 diabetes (T2D) in Chinese Hans, we have identified or confirmed over 400 genetic variants associated with obesity, T2D, dyslipidemia, as well as metabolic pathway(s) for certain nutrients. For instance, by leading trans-ethnic GWAS for Fatty Acids, we have identified 10 novel and confirmed 13 reported loci for saturated fatty acids (SFAs), polyunsaturated fatty acids (PUFAs) and monounsaturated fatty acids (MUFAs). Meanwhile, significant heterogeneities for these loci were also noticed between Chinese and European populations, including different effect sizes (FADS1 and PKD2L1 variants) and also minor allele frequency (ELOVL2 variant) between Chinese and Europeans. Moreover, we also identified multiple nutritional biomarkers, which were associated with prevalence or incident MetS, T2D and other health outcomes, like kidney function decline and hyperuricemia, a risk factor for gout and also cardiovascular diseases. The levels of these metabolites may be partially driven by intake of foods that are associated with hyperuricemia like red meat and seafood. Moreover, adding a panel of acylcarnitines, especially long-chain ones, was showed to substantially improve predictive ability for incident diabetes beyond conventional risks. In a randomized, double-blinded controlled trial, daily supplementation with 2000 IU vitamin D3 (the upper intake level in China) for 20 weeks significantly raised 25(OH)D concentrations, but still left 25% participants with uncorrected deficiency. Genetic factors exerted stronger impact than non-genetic factors (baseline value, BMI and gender) on 25(OH)D responses; while overweight persons showed lower 25(OH)D response than in normal weight persons. Recently, we also applied lipidomic, metabolomics or metagenomic sequencing in our cohort and dietary intervention trials and detailed findings will be presented in the conference. Collectively, the omics not only provide novel insights into nutrition metabolism and pathophysiologic basis of metabolic diseases, but also facilitate achieving the goals of precision nutrition and disease prevention.

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Applying Personalized Nutrition Principles in the Quantification and Delivery of Desired Health Outcomes

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Keyword: Personalized Nutrition · Precision Wellness · Quantified Self · DNA testing · Health improvement

Differences in the response of people to dietary components have been well documented for almost a century across different geographies and cultures. This provides the basis, and motivation, for developing personalised nutrition strategies. The growing trend towards personalised nutrition is the result of; one, more nutrition research providing better understanding of the effects of diet on health; secondly, technological advances that enables better and continuous measurements of biomarkers of individual health and fitness; and lastly, new analytical tools that interpret these data, transforming it into user-friendly recommendations and advice. This session will present recent trends and findings that support the continued growth of this new area of nutrition and health, while sharing the various approaches that can be adopted in formulating a consumer-relevant solution. Currently, most commercial personalised nutrition interventions are provided directly to the consumer through the internet, but alternative models may improve the acceptance of these interventions, while addressing other challenges. The presentation will be followed by a panel discussion on the scientific basis of the rising trend of personalized nutrition, the appeal and benefits, and the challenges for the mass adoption by consumers in the near future. The panellists include Dr. Xu Lin, Professor, Principal Investigator of the Institute for Nutritional Sciences, Shanghai Institutes for Biological Sciences (SIBS), Chinese Academy of Sciences (CAS), Dr. Felix Zhang, Director of Nutrition & Health Research Centre, By-Health and Dr. Wim van Hartingsveldt, Business Development Manager Healthy Living, TNO.

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The Importance of The Food System for the Obesity Epidemy

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Keywords: Food system · Obesity · Food production

Close links between mid- and long-term changes of our global food systems and the daily nutrition and the overall health situation of our populations can be observed. In regions with affluence, food abundance, highly developed food-production- and food-processing-systems as well as decreasing physical activities and the transformation from traditional food production and eating patterns towards the consumption of energy-dense food and sugar-sweetened beverages, has resulted in dramatic increases in obesity rates and the occurence of nutrition-related non-communicable diseases. The food system plays an important role in ensuring access to a high quality diet that includes diversity of foods, that are safe foods, and provides adequate levels of energy as well as micronutrients, but also in providing less adipogenic food. Since the Green Revolution, intense research and investment was focussed on a small number of staple food (wheat, corn, rice, potatoes, oil crops and sugar-plants). This one-sided promotion of these food plants has eroded the diversity of food and the overall nutrient content in food systems. While calories from these staple food have become cheaper and more available, dominating foods worldwide have become increasingly homogenized. Nowadays, global food supply is closely associated with an increased supply of these staple crops, which are used in a wide variety of processed food. As a result, fruits, vegetables, whole grains, legumes and nuts are even more under-represented in the food supply and in many countries these foods are rather costly. These huge changes have been facilitated by trade liberation and reduction of export taxes in producing countries and less restrictions in importing countries. These trends have been complemented by the formation of large and powerful multinational food companies and food trading conglomerates. To overcome the obesity epidemy, a transformation to more healthy diets and a more sustainable food system are urgently needed and also a better alignment of agri-food policies with science-based nutrition goals.

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Community-Based Nutrition Education Programs: Vietnam Experiences

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Keywords: Nutrition education · Nutrition months · GNKHC · Food -Based dietary guidelines · Physical activity

Background/Aims: Malnutrition, in every form, presents significant threats to human health. Today the world, including Vietnam, faces a double burden of malnutrition that includes both undernutrition and overweight. In Vietnam, Child malnutrition (underweight) prevalence has been remarkably reduced: from 51.5% in 1985 to 25.2% in 2005 and it was 17.5% in 2010 and 13.4% in 2017. The prevalence of stunting of children under 5 was 59.7% in 1985, 43.3% in 2000, 29.3% in 2010 and 23.8% in 2017. Besides, the rate of obesity among children under 5 years of age was 5.9% in 2017, and is 6 times higher than that in the year 2000. The prevalence of overweight and obesity of primary school children (6–9 y old) in HCM City was very high- 20% in 2002 and it was 38.5% in 2010. Micronutrient deficiencies were the public health problem in Vietnam especially anemia among <5 children and women: The results from National survey 2015 showed that it was about 27.5% of <5 anemic children, for reproductive aged women the prevalence of anemia was 25.5% and 32.8% for pregnant women. One of the causes of malnutrition is poor nutrition knowledge and improper feeding practices. So that the nutrition education for reproductive aged women, lactating mothers and the community is very important. **Methods:** Nutrition education activities in the framework of NPANs were implemented at all levels from central to grassroots. Food-based Dietary Guidelines was very effective tool for education. Different education

methods/strategies were used (Mass media, training for health workers, women Union system and nutrition collaborators; school education programs, nutrition education package (GNKHC) of SEA-PHN and launching Nutrition Months. **Results:** In the framework of NNS 2011–2020: Nutrition education materials were developed and distributed to the nutrition network from provincial to commune health centers. Training courses on breastfeeding, supplementary feeding, and introduction of FBDG for health workers, Women Union members and nutrition collaborators were conducted. As a result, the child malnutrition (underweight, stunting) prevalence as well as micronutrient deficiencies have been remarkably reduced. Positive secular trends in growth of children and young Vietnamese have also been observed. Capacity building and nutrition network from central to grassroots levels have been developed and strengthened. The Nutrition Months of Vietnam with different topics were launched from 2015 to 2019. Since VINUTAS has joined the SEA-PHN network with nutrition societies/associations of Indonesia, Malaysia, Philippines, Thailand. All countries utilised the same developed nutrition package, monitoring tools and followed the same implementation protocol. The contents were translated into Vietnamese and customised to meet local social and cultural practices. Technical working group was established and the developed educational package has been implemented successful in 2 selected schools. **Conclusions:** The contribution of nutrition education programs has received high recognition of the country to promote healthy dietary habits and a physically active lifestyle for the prevention of malnutrition and NCD's in Vietnam.

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Experiences and Future Perspectives on The National Nutrition Policy In South Korea

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Keywords: National nutrition · Policy · South Korea

Together With The Rapid Increase Of The Nation's Low Birthrate And Aging Population, The Burden Of lifestyle-related chronic disease is growing. Nutrition and diet are important determinants of chronic diseases. Therefore, more aggressive measures to improve national nutrition are becoming essential to cope with chronic diseases and reduce national medical expenses. The National Nutrition Management Act was enacted in 2010 to promote health, diet, and nutrition of the Korean population by developing nutrition strategies and policies based on scientific evidence. According to Article 7 requiring to set plans and measures needed for the nutrition management of the people every five years, the second National Health Promotion Comprehensive Plan (2017~2021) was set with various nutrition sector goals. Also, according to Article 14, which requires amendments of the Korean dietary reference intakes (DRIs) for nutrients in the diets of healthy individuals in every five years, the 2020 expert Nutrition Review Committee was formed to update, replace, and expand upon the 2015 DRIs based on the current scientific findings. Given that most nutrition problems are linked to the life cycle, it is necessary to ensure that new projects need to be constructed with a consideration of target population group. High priority should be given to the child care policy, child care policy, child care policy, low birth rate, aging society response policy, elderly welfare policy, disease control policy and long-term care policy, rather than the nutrition policy alone. The presentation will provide detailed information on experiences and future perspectives of national nutrition policy in South Korea.

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Championing Nutrition Through Transformational Leadership

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Keywords: Nutrition · Transformational leadership· Nutrition leadership

Nutrition, being interdisciplinary and multi-sectoral in nature, is a cornerstone for building strong human capital and sustainable development. For a nutrition service to be delivered effectively, professionals who share a common ground in nutrition must have the ability to work across sectors, disciplines and political sublevels. To address the persisting and future challenges for nutrition, strong advocacy with high-level collaboration, effective communication and sharing of technical inputs within and between stakeholders are necessary. Transformational leadership, the ability to drive engagement and focus on people's excellence to realize a goal, is therefore imperative in nutrition. The role of leadership skill development in nutrition has received greater attention in the past decade. Capacity-building workshops and networking of leaders provide the opportunity to share the latest knowledge, evidence, and cutting-edge tools needed to bring about change in nutrition policies and programmes. Nutrition leadership initiatives are intended to create national and regional platforms and empower nutrition professionals so that they are able to catalyse change and strengthen cross-sectoral and vertical engagement from national to the grassroots level. Transformational leadership plays a crucial role in building and guiding multidisciplinary teams and ensuring that nutrition outcomes and impacts are prioritized. A network of nutrition leaders having a common purpose not only empowers the human resource but can also lead the entire system towards committed actions to help end malnutrition.

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Young Nutritionist Organization: Lesson Learn From Bachelor of Nutrition Organization of Indonesia (ISAGI)

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Keywords: Nutritionist · Organization · ISAGI

Bachelor of Nutrition in Indonesia is a new profession, the first alumni of the undergraduate program in the field of nutrition has been around since 2006. After more than a decade, there have been tens of thousands of undergraduate nutritionists in Indonesia. On this basis, an organization was formed that can accommodate nutrition scholars in Indonesia. Since 2010 a specialized nutrition organization (ISAGI) was formed. The main objective of the organization is to help improve the competence and ability and motivation of each member to play a role in the development of nutrition, especially in Indonesia. ISAGI is the only nutritional organization that the majority is managed by young nutritionists. ISAGI has carried out various programs, such as nutrition competency training, community nutrition education activities and nutrition leadership training for youth. In addition, ISAGI also contributed to important meetings that discussed nutrition policy in Indonesia. ISAGI provides support to young nutritionists to continue to excel, one of which is a recommendation to get a scholarship, support from speakers at various seminars and giving motivation to prospective nutritionists. Of course, many obstacles and challenges are faced, but with the principle of "big impact small actions" ISAGI can grow into an organization that is beneficial for nutrition development.

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The Role of Nutritionists and Dietitians Around The World

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Keywords: Nutrition and dietetics · Education · Practice · Roles · Responsibilities

Nutrition and dietetics is one of the youngest professions in Indonesian Health Care System. Despite its inception from early 1950s, the profession has not gain significant roles and development until 2003 when the first bachelor's degree in nutrition was offered at major public Universities such as Gadjah Mada University, Diponegoro University, Brawijaya University, University of Indonesia and Bogor Agricultural University. Since then, the profession has undergone significant changes in its education, professional practice and organizational systems. However, it is clear that the growth of the profession, particularly the roles, responsibilities and development in Indonesia has been somewhat lagging behind other countries around the world. Thus, this paper aims to compare the education systems, roles and responsibilities of Nutritionists and Dietitians in Indonesia against more established groups who have shaped the profession and created standards for education and practice, i.e. the Academy of Nutrition and Dietetics USA and the Dietitians Association of Australia. This comparison highlighted the more advanced roles and responsibilities assumed by Nutritionist and Dietitians in the USA and Australia which were supported by their comprehensive education and training systems compared to Indonesia. Hence, to move forward, it is essential that Indonesian Nutritionists and Dietitians seek collaborations with International Nutrition and Dietetic colleagues to extend work in developing the profession. This is even more important considering that nowadays nutrition-related diseases are becoming global health issues and client's need for a more professional and specialists dietetics service by Indonesian Nutritionists and Dietitians.

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Chicory Root Fiber in Preventive Eating – A Science Update

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Keyword: Prebiotic · Microbiome · Inulin · Oligofructose

Chicory-derived inulin-type fructans are dietary fibers with established prebiotic effects. The specific changes both in composition and/or activity of the gastrointestinal microbiota provide benefits for human health. Since the concept was first defined it has been subject of intensive research, and prebiotic research has continued at a rapid pace with more than 3000 research articles published over the past 5 years. Physiological health benefits of chicory-derived inulin-type fructans, such as the positive modulation of gut microbiota, laxation/bowel function, effects on energy intake and body weight, mineral absorption and bone health have been demonstrated in various human intervention studies. Recent studies conducted as randomized, double-blind, placebo-controlled trials confirm the beneficial effects of on laxation/bowel function in healthy adults as well as in young children. The effect of on the gut microbiota was assessed using next generation sequencing technology. Chicory-derived inulin-type fructans have a selective effect, with specific changes observed for Bifidobacterium, Anaerostipes and Bilophila. Decreased Bilophila, a genus containing known pathobionts, is linked with improved constipation-related quality of life measures and softer stools. Recent studies targeted health outcomes beyond digestive health such as the potential of prebiotic fructans in the management of pediatric overweight and obesity. Prebiotic supplementation resulted in significant improvements in sensations of appetite, reductions in energy intake as well as body weight and fat in overweight children. These recent intervention studies extend the body of evidence on distinct health benefits related to prebiotic chicory root fiber in preventive eating and provide further insights into the fructans-associated prebiotic mechanism.

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The Gut Microbiome and the Beneficial Influence of Prebiotics

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Keyword: Prebiotic · Microbiome · Inulin · Oligofructose

Human digestive tract colonizes trillions of bacterial cells and diet plays the key role among the factors that influence the composition of gut microbiome. Compared to ordinary diet, prebiotics are defined as "substrates that are selectively utilized by host microorganisms conferring a health benefit". Historically, prebiotics are mainly focused on carbohydrates, while polyphenols and polyunsaturated fatty acids are also becoming new candidates, even though polysaccharides and polyphenols are considered as major active ingredients in a wide range of traditional Chinese herbs. The assessment of potential prebiotics should no longer base on its biochemical structure, but on clinical outcomes under an effective dose. Properly designed clinical trials and peer-reviewed publications have become the basic requirements for making a corresponding health claim on prebiotics. Since the positive improvement of colonic microbiota structures and metabolism is only target for prebiotics, chronic or acute human diseases derived from direct or indirect consequence of the microbial dysbiosis, can be remedied using prebiotics as prophylactic and therapeutic agents. So far, GOS, FOS (oligofructose) and inulin have reached the prebiotics selective criteria due to numerous randomized controlled trials across a range of populations. Type II diabetes, obesity, metabolic syndrome and bone health are the most metabolic and degenerative diseases that can be intervened by prebiotics. Given the fact that the prebiotic effect could be varied depending on the personalized microbiota, to elucidate and understand the complex interactions between prebiotics, microbiome and host outcomes is becoming the most exciting and challenging study in the future.

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Efficacy of Homemade Diet in Management of Severe Acute Malnutrition of Rohingya Refugee Children

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Keywords: SAM · Counseling · Nutrition Intervention · Egg-suji · Nutritional Status

Prevalence of Severe Acute Malnutrition (SAM) among Rohingya children aged 6–59 months living in a refugee camp in Cox's Bazar district was found 7.5%. The objective was to document efficacy of homemade diet on recovery from SAM of Ro-

hingya children. A sample of 645 SAM children (MUAC <11.5 cm) aged 6–59 months were enrolled for an intervention lasting three months and two months of follow up. Food ingredients (rice powder, egg, sugar, and oil) were supplied to families for three months to cook 'Egg-suji' for feeding the children along with nutrition counseling and demonstration for recipe preparation. The study had the element of anthropometry of the children to assess the nutritional status. After intervention, mean energy intake from diet increased from 455.29 ± 120.9 Kcal/day to 609.61 ± 29.5 Kcal/day (P = 0.001) in three months. Mean frequency of daily food intake improved from 4.89 ± 1.02 to 5.94 ± 0.26 (P = 0.001). Body weight increased from 6.3 ± 1.04 kg to 9.93 ± 1.35 kg, height increased from 67.93 ± 6.18 cm to 73.86 ± 0.35 cm and MUAC improved from 11.14 ± 1.35 cm to 12.79 ± 0.37 cm (P = 0.001). HAZ changed from −3.64 ± 1.35 to −2.82 ± 1.40, WHZ improved from −2.45 ± 1.23 to 1.03 ± 1.17, WAZ improved from −3.8 ± 0.61 to −0.69 ± 0.78, MUACZ improved from −3.32 ± 0.49 to 1.79 ± 0.54 (P = 0.001) from beginning to end of observation. Morbidity was found in 5.12% children in the first month which reduced to 0.15% at the end of study. **Conclusion:** Nutritional counseling and supply of food ingredients at refugee camps resulted in continued improvement of the nutritional status of SAM children.

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Prevention and Control of Obesity in China

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Keywords: Overweight · Obesity · Overview · China

According to the National Nutrition and Health Survey, the average BMI of Chinese residents in 9 provinces increased from 21.2 kg/m² to 22.9 kg/m² during 1989–2011. Moreover, 33% Chinese adults are either overweight or obese. It is recognized that prevention is the most feasible option for curbing childhood and adult obesity epidemic since current treatment practices are largely aimed at bringing the problem under control rather than a cure. During 2014–2017, experts studied on the epidemics, hazards, diagnosis as well as treatment and prevention of obesity in China. This report showed an overview of overweight and obesity in China, as well as the suggestions of prevention for individuals and groups. The goal in fighting the obesity epidemic is to achieve an energy balance and healthy weight which can be maintained throughout the individual's life-span. General recommendations from the Obesity Work Group of CNS (Chinese Nutrition Society) include: a balance diet, increasing consumption of fruit and vegetables, as well as whole grains, limiting high energy intake from total fat, and being more physically active-accumulate at least 60 minutes of regular exercise daily. Special recommendation to someone working on obesity management, including the standardized evaluation and management measures, were suggested for the general individual and special age groups. The national preventive strategy for whole population was also established. This report is expected to promote the overall development of future work in the field of obesity and chronic disease prevention and control in China.

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Target Integration and Nutritional Indicators of SDGs in National Development in Indonesia

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Keywords: Nutrition targets · SDGs indicators · National development · Indonesia

This paper explains Indonesia's experience in how to integrate nutritional targets and indicators in the SDGs into the National Development Plan (RPJMN) 2020–2024. The RPJMN is an important document as a reference for preparing the strategic plan of each ministry, and local goverment. At present Indonesia faces a double burden of malnutrition characterized by high prevalence of stunting and wasting in children under five, high nutritional anemia in pregnant women, high obesity in children under five and adults, and high prevalence of non-communicable diseases (NCD) related to nutrition, including diabetes mellitus, stroke and cardiovascular. Risk factors for NCD such as smoking at a young age, lack of physical activity and low intake of vegetables and fruits, are related to nutritional problems. In the RPJMN 2020–2024, most targets and nutrition related indicators have been integrated. This is an important effort because in the next five years nutrition programs and activities will have a solid foundation and be supported by sustainable resources. Integration of nutrition into the RPJMN is listed in the section on the development of quality human resources and environmental development, disaster resilience and climate change.

Symposium Session

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The Nutritional Dilemma in The Early Days of Life: How to Promote Linear Growth, but Reduce The Risk of Obesity

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Keywords: Early life · Obesity · Reduce risk

Globally, in 2018 edition of Joint Child malnutrition estimated 151 million children under 5 suffer from stunting, with nearly all stunted children living in low-income countries. Stunting is associated with decreased survival, impaired cognitive and motor development, reduced economic productivity, and higher chance of living in poverty in adulthood. The linear growth of children is dependent upon the chondral growth plate Bone growth by the chondral plate is regulated by mTORC1 and the availability of all amino acids essential. These cannot be synthesized within the human body; they must be obtained through diet; the best sources are animal source foods (ASFs) (milk, eggs, fish, poultry, and meat).

Plant sources also contain these, but typically in much lower concentrations with significant reduction of limiting amino acids ((methionine, lysine, tryptophan). In addition, ASFs are dense in a wide range of micronutrients linked to growth and cognitive development (iron, B12, choline, zinc), and cow's milk is uniquely rich in calcium and its ability to stimulate the secretion of insulin-like growth factor I (IGF-I), a hormone that stimulates bone and tissue growth. Whether current dietary recommendations of essential amino acids are sufficient for children in low-income settings – where the burden of infectious disease and metabolic needs for immune system activation may partition limited essential amino acids to support immune function at the expense of growth. However a higher animal protein intake, especially dairy, at 12 mo may be associated with an overweight and obesity at 7 y. There have been some thoughts to establishing an upper level for protein intake during the first years of life to prevent stunting that would take the risk of overweight and obesity into account.

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Role of Protein in Later Stage of Life

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Keywords: Protein · Ageing well · Physical function · Cognitive function

Role of Protein in Later Stage of Life Ageing well is a global goal for ageing populations. A life course approach in which physical and cognitive functioning capacity is built up in childhood peaking in adulthood, and then declines in older age should be considered. Substantial evidence suggests that maintaining the highest possible level of function in adult life and midlife is vital to ageing well. Protein has long been considered as one of the key nutrients for muscle mass preservation and physical function maintenance, in particular in later stage of life. Both the quantity and quality of the protein intake, as well as the timing and dosage distribution of protein consumption all influence the net protein balance. In this presentation, the importance of nutrition, in particular with the focus on protein for ageing well will be discussed. Some recent findings regarding the role of protein quantity and protein quality in relation to physical and cognitive functioning, as well as other health outcomes in later stage of life will also be summarized. Potential strategies and recommendations to improve protein quantity and protein quality will be briefly discussed.

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Connecting the Dots: The Role and Responsibility of Food Processing Industry on the Food and Nutrition Security System in Indonesia

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Keywords: Food processing · Food system · Food industry

The prevalence of malnutrition can be used as an indicator of food and nutrition insecurity. Global report suggested that around one out of every nine person in the world is undernourished. Basic Health Research (2018) reported, among others, that (i) the prevalences of undernourished and stunted children (under 5 years olds of age) in Indonesia are, respectively, 17.7% and 30.8%, and (ii) the overweight and obese population of adults aged 18 and above are, respectively, 13.6% and 21.8%, meaning that roughly about one in every three adults, have weight problems. Those indicators are alarming and present a clear challenge for Indonesia to achieve the Sustainable Development Goals. In this context, development of sustainable food system —covering "from farm to fork", including production, processing, marketing, (international) trade, and consumption of sufficient, safe, nutritious food to maintain a healthy and active life— is a strategic way forward to deliver food and nutrition security. To make the system well functioning, connecting the dots between all actors of food system actors from all stakeholder is essential. One of those dots is food processing industry, connecting agriculture (production) and consumers (consumption). Generally, food processing industry has capacity to reach the consumers in effective and efficient manner. Specifically, the presentation will higlight several critical roles and responsibilities of food processing industry in improving multiple aspect of food and nutrition security, especially on aspect of availability, accessability, consumption, and sustainability. In addition, roles and responsibilities of food processing industry beyond the food production will also be presented.

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Connecting the Dots: Food, Nutrition Security and Policy

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Keywords: Food · Nutrition security · Food policy

Hunger and the multiple burdens of malnutrition cause suffering and hold back economic potential. Eliminating food and nutrition insecurity is fundamental to reach all of the SDGs not to leave anyone behind by 2030. Leadership and policy for food system covering inclusiveness ensuring economic and social inclusion, sustainability, improved productivity, nutritious and healthy food are the challenges to sustainably and nutritiously feed 9.8 billion people by 2050, while inclusively lifting millions of smallholder farmers out of poverty. Looking at the value chain of food system, offers a number of potential benefits for addressing those insecurities, where each stakeholder can participate in any respective capacity. There is a vicious cycle of diseases and malnutrition linked to food safety concerning expectation, fact and gap. Panelist would share the facts and highlight of food safety, interlinked with diseases, malnutrition. The focus will be started with the framework of risk management and analysis, data availability, the key stakeholder, policy, laboratory, education, and core key issues that has not been addressed throughly. The recommendation and solution would be shared to the developing countries including Indonesia

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Connecting the Dots: Food, Nutrition Security and Policy from Private Sector Site

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Keywords: Food security · Nutrition security · Food policy

Food security is related to all of the UN Sustainable Development Goals (SDG). Improved food security governance based on sound, equitable, and sustainable food system that benefits from modern information and sustainable agricultural technologies is essential for countries to meet SDG. Verbatim of "End Hunger" in SDG 2 carry a mission to achieve food security and improved nutrition and promote sustainable agriculture. Public Private Partnership, synergy, integration across the value chain of food system offers a number of potential benefits to those insecurities. To reach the consumers, Food Industry, Culinary, SME plays important role of fresh agriculture products processing to household consumption. Based on Indonesia consumption data, 50% of expenditures is in food consumption and 13% is contributed by industry. Therefore, the role of the consumer educations is also very important to drive the rest of 37% food consumption. To reach consumers it is important to consider affordability, accessibility and aspirational way to fulfill the needs of individual for active and healthy live across value chain. Understanding global value chain, international trade and synergy of policy and regulatory are the key to ensure food and nutrition security, from breeding, to seed, farming, processing- preparation for individual to live healthy and active are needed to achieve SDG's.

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Human Milk Oligosaccharides – Overview of Nutritional Significance

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Keyword: Milk · Oligosaccharides · Nutritional

Research on human milk oligosaccharides (HMOs) has received much attention in recent years. However, it started about a century ago with the observation that oligosaccharides were the prebiotic "bifidus factor" that promotes a healthy microbiota composition that is beneficial to breast-fed infants. Much data has been accumulated over the years to support the health benefits of HMOs. HMOs are a family of structurally diverse soluble carbohydrates unique to human breast milk, made up of a lactose core bonded to other simple sugars. They are the third most abundant component in human milk, after lactose and lipids, contributing to approximately 10% of total solids. Over 200 structurally different HMOs have been identified, each may have a distinct functionality. The amount and composition of HMOs are highly variable among women, and over the period of lactation. The most abundant of these oligosaccharides, and to most studied to date, is 2' Fucosyllactose (2'FL). The reported average levels 2.4 g/L, high during the early stage of lactation, decreasing later. This presentation summarises the potential role of HMOs, particularly 2'FL, in improving the immune health of infants. Much evidence has been accumulated to investigate how 2'FL influences microbiota composition and/or activity. More than 90% of the 2'FL reaches an infant's large intestine undigested. It serves as a prebiotic, providing nutrients for beneficial bacteria —particularly Bifidobacteria. As such, 2'-FL, when added to infant formula, can help establish dominance of these beneficial bacteria over the pathogenic species, thereby promoting a healthy intestinal flora and immunity. Current evidence suggests establishment of Bifidobacteria early in life plays a role in programming future health. The adhesion of pathogens to human epithelial cells is usually the first step towards successful colonization and subsequent systemic infection. HMOs have been shown to be able to mimic cell surface receptor structures, acting as soluble decoys, preventing adhesion colonization of epithelial surfaces. Studies have demonstrated the ability of 2'-FL to inhibit pathogen adhesion to intestinal mucosa. In addition, in-vitro studies suggest that HMOs directly modulate immune responses. HMOs may act either locally, on cells of the mucosa-associated lymphoid tissues, or at a systemic level, as 1% of HMOs are absorbed and reach the systemic circulation.

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Protein Requirements and Optimal Intakes for Aging: Are we ready to Recommend More than the Recommended Daily Allowance

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Keywords: Protein · Aging · Sarcopenia · Recommended Daily Allowance

The Dietary Reference Intakes set the protein RDA for persons >19 y of age at 0.8 g protein/kg/d. A growing body of evidence suggests, however, that the protein RDA may be inadequate for older individuals. The evidence for recommending a protein intake greater than the RDA comes from a variety of metabolic approaches. Methodologies centered on skeletal muscle are of paramount importance given the age-related decline in skeletal muscle mass and function (sarcopenia) and the degree to which dietary protein could mitigate these declines. In addition to evidence from short-term experimental trials, observational data show that higher protein intakes are associated with greater muscle mass and, more importantly, better muscle function with aging. We are in dire need of more evidence from longer-term intervention trials showing the efficacy of protein intakes that are higher than the RDA in older persons to support skeletal muscle health. We propose that it should be recommended that older individuals consume ≥1.2 g protein/kg/d and that there should be an emphasis on the intake of the amino acid leucine, which plays a central role in stimulating skeletal muscle anabolism. Critically, the often-cited potential negative effects of consuming higher protein intakes on renal and bone health are without a scientific foundation in humans.

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Impact of Whey Protein-Rich Higher-Protein Diet on Body Weight and Composition Management in Middle-Aged and Older Adults

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Keywords: Whey protein · Body composition · Middle-aged and older adults · Women-friendly

A mounting of evidence indicates that consuming higher-protein diet is an effective mean to manage body weight and composition in various energy states and exercise training conditions. Currently, there is considerable interest in the use of dairy proteins, whey protein in particular, as supplements or in conjunction with lifestyle changes to improve body composition in vulnerable population such as middle-aged and older adults. Higher-protein diet with whey protein maintained the body weight and improved the body composition by losing fat mass during 9-month exercise training in overweight and obese middle-aged adults. In addition,

a 6-month intervention in mobility-limited older adults indicated that whey protein supplementation in combination with resistance exercise tended to promote greater increases in lean mass, mid-thigh cross sectional area, and muscle strength. Of practical concern, there is a perception that whey protein supplementation may induce "bulkiness" in women. Findings from a recent systematic review and meta-analysis suggest that whey protein supplementation improves body composition by modestly increasing lean mass and this improvement is more robust during weight loss in women. Collectively, in conjunction with lifestyle changes, consuming whey protein-rich higher-protein diet is an effective dietary strategy to improve body composition, especially in middle-aged and older adults. Moreover, whey protein may be more beneficial for improving body composition when included as part of a weight loss program in women.

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Nuts in Diabetes Prevention and Management

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Keywords: Nuts · Diabetes · Insulin resistance · Hyperglycemia
Nuts in diabetes prevention and management.Prof. Anoop Misra, Chairman of Fortis-CDOC, Center of Excellence for Diabetes, Metabolic Diseases and Endocrinology in New Delhi, India. Benefits of nuts include salutary effects on insulin resistance and hyperglycemia. Some nutrients in nuts (monounsaturated fatty acids, polyunsaturated fatty acids, fibre etc.) are known to improve insulin sensitivity and glycemia. Studies show beneficial effects of nuts on glycosylated haemoglobin and blood glucoselevels. Nuts as replacement to carbohydrates in diets has been shown to improve glycemic control and lipids. Effects of nuts on abdominal obesity, lipids (and lipoprotein subclasses) and subclinical inflammation as seen in some studies may also be helpful in patients with type 2 diabetes in relation to atherosclerosis. Chronic intake of some nuts has been shown to modulate metabolites related to gut microbiota and tricarboxylic acid cycle, associated with insulin resistance and type 2 diabetes. In addition, chronic nut intake modulates micro-RNAs implicated in insulin sensitivity in subjects with prediabetes. Other effects of nuts in patients with type 2 diabetes include improved hemodynamics, heart rate variability and blood pressure on ambulatory blood pressure monitoring. Clearly, more studies are needed with nuts, in various conditions related to diabetes (e.g. prediabetes, prevention of diabetes), complications of diabetes, and diabetes-related cardiovascular risk. These studies would be of immense importance to populations at enhanced risk for diabetes (e.g. South Asians).

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Nuts, Mediterranean Diet and Cardiovascular Disease

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Keywords: Nuts · Mediterranean diet · Cardiovascular disease · Heart health
Nuts, Mediterranean diet and cardiovascular disease. Prof. Linda Tapsell, Senior Professor at University of Wollongong, Australia. Prof. Tapsell is a leading Australian researcher in Nutrition and Dietetics. For over 30 years she conducted ongoing clinical trials manipulating the macronutrient content of diets, testing the impact of individual foods on health outcomes and evaluating the efficacy of healthy dietary patterns in lifestyle interventions. Research on the Mediterranean diet has provided the scientific community with increased confidence in the evidence base for its protective effects in cardiovascular disease. Nuts are a significant component of the traditional Mediterranean diet, and their contribution to the macronutrient composition of the diet may in part explain effects. However, nuts are a whole food delivering multiple nutrients which have an interdependent biological purpose related to the physiology of the nut. Thus the evidence associated with nut consumption can be considered in its own right. Building our understanding of how foods such as nuts influence health will reflect advances in food composition analysis utilising the capacities of modern chemistry and molecular biology. In the meantime observational studies and clinical trials of both the Mediterranean diet and nut consumption will continue to provide the substantive evidence of the health benefits of nut consumption as part of a protective dietary pattern. This presentation provides an overview of research in this area.

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Nuts and Brain Function

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Keywords: Nuts · Cognitive decline · Memory · Brain function.
Nuts and brain function. Dr. Emilio Ros, Former director, Lipid Clinic and Senior Consultant, Endocrinology and Nutrition Service, Hospital Clínic, and Emeritus Investigator, IDIBAPS, Barcelona, Spain.Oxidative stress and vascular impairment are believed to mediate in part age-related cognitive decline, a strong risk factor for dementia. Nuts are rich in phenolic compounds that might counteract oxidative processes in the brain leading to neurodegeneration. Prospective studies and clinical trials indicate that exposure to nuts reduces cardiovascular risk factors such as blood cholesterol, hypertension and diabetes, all established links of cognitive dysfunction. Experimental studies in aged rats have related dietary supplementation with nuts to improved cognitive outcomes. Limited epidemiological evidence suggests that regular nut consumption is associated with better cognition. In a cross-sectional analysis of older participants in the PREDIMED nutrition

intervention trial assessed with neuropsychological tests, consumption of nuts (walnuts) independently related to better cognition, particularly memory function. The longitudinal study of the same individuals retested after intervention for a median of 4 years disclosed that those allocated to the Mediterranean diet supplemented with 30 g/d mixed nuts improved memory and executive function compared to controls, indicating that regular consumption of nuts counteracts age-related cognitive decline. Thus, there is suggestive evidence that nut diets might be a useful tool to prevent or at least delay the cognitive decline that frequently affects older persons in our aging populations.

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Effect of Prunes on Bone Status and Bone Biomarkers

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Keywords: Prunes · Osteoporosis ·Bone loss · Bone health
Effect of prunes on bone status and bone biomarkers.Dr. Shirin Hooshmand, Associate Professor, School of Exercise and Nutritional Sciences, San Diego State University, USA. Osteoporosis is an age-related chronic disease characterized by a loss of bone mass and quality, and is associated with an increased risk of fragility fractures. Typically thought of as a disease impacting women, increasing attention is being paid to osteoporosis in men; however, little research has been conducted to address the situation. About 47% of men older than 50 years have osteopenia and as many as one in four men over the age of 50 years will develop at least one osteoporosis-related fracture in their lifetime. Certain lifestyle factors, including nutrition and exercise, are known to reduce the risk of developing osteoporosis and therefore play an important role in bone health. In terms of nutrition, accumulating evidence suggests that prunes are potentially an efficacious intervention for preventing and reversing bone mass and structural loss in ovariectomized and orchidectomized rat model of osteoporosis, in osteopenic postmenopausal women and in healthy men. Overall, the findings of our studies in both men and women and others strongly suggest that prune in its whole form is a promising and efficacious functional food therapy for preventing bone loss with the potential for long-lasting bone-protective effects.

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Growing New Zealand's Science to Take High-Value Foods to the World

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Keywords: Systems nutrition · Food innovation
High-Value Nutrition (HVN) is a New Zealand National Science Challenge that supports high quality translational science to enhance NZ's competitive advantage and drive innovation and value generation in New Zealand's food and beverage sector, and to provide insights into the role of foods and diets in promoting and maintaining health. HVN is positioned at the public/private research interface, involving universities, institutes and companies across NZ. Four long-term research themes have been defined: (i) infant health with a spotlight on gut microbiome around weaning; (ii) metabolic health, with a focus on early diabetes: (iii) gastrointestinal health addressing functional gut disorders; and (iv) immune defence targeting improved protection against pollution. Within these programs, research includes cohort studies linking dietary patterns with health, and human dietary intervention studies. The four individual programmes are closely associated with each other, and share a common underpinning systems biology approach. Complementary to these themes, HVN leverages genuine and iconic NZ foods into higher value propositions by scientifically evaluating their health benefits. These foods include kiwifruit, green-shell mussels, grass-fed beef, and natural milk. All research is underpinned by programmes of understanding consumer needs in the target population of Chinese consumers, and food technology developments which will support the on-going development of high-value foods. HVN is fully committed to Vision Mātauranga, the New Zealand national policy to unlock the science and innovation potential of Māori knowledge, resources and people.

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Peak Nutrition for Metabolic Health (PANaMAH) Program: The TOFI_Asia Study

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Keywords: Prediabetes · Ectopic fat · TOFI · Asian Chinese
Obesity and adverse metabolic health continues to rise globally, with ~2 billion overweight and 500 million adults with type 2 diabetes (T2D). Urbanization in Asia has led to ever increasing numbers, particularly China with estimates of ~50% with prediabetes and ~100 million with T2D. Asian adults may have high susceptibility to T2D, including young adults and those with 'lean' BMI. Predicting risk can be challenging, with other ethnicities obese yet resilient to dysglycaemia. Susceptibility may be driven by body composition, including lipid 'overspill' from safer subcutaneous/peripheral stores into riskier ectopic sites of pancreas, liver and muscle, and subsequent lipotoxicity. The 'Thin on the outside fat on the inside' (TOFI) profile in Asians may characterize a susceptible phenotype, and be an early predictor of T2D risk before dysglycaemia emerges. In our recent TOFI_Asia study we hypothesized that (i) ectopic lipid deposition in pancreas and liver may promote pancreatic β-cell dysfunction and hepatic insulin resistance/glucose intolerance, (ii) Asian ethnicities may be susceptible, (iii) predictive plasma biomarkers can be identified and used to target nutrition intervention. In a cohort of ~400 adults we characterised bodycomposition, including magnetic resonance imaging/spectroscopy (MRI/S) of pancreas and liver, glycaemia-related blood biochemistry, and metabolite features using

global LC-MS, in overweight normo- and dysglycaemia Asian Chinese and Caucasian Europeans. Early findings show ethnicity differences characterised in Chinese by low amino acid (AA) and related-metabolites, and low sulfate-related gut microbial metabolites; and (ii) characteristic metabolite profile of high pancreatic fat again with low AAs; and high liver fat.

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Promoting Mental Health through Healthy Eating in the School Setting

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Keywords: Mental health · Healthy eating · School setting

Good nutrition is integral to mental health. The World Health Organization has acknowledged "there is no health without mental. The overall goal of the presentation is to support the work of dietitians and to guide future dietetic practice as it relates to mental health with an evidence-based summary of the current literature about the promotion of mental health through healthy eating. Mental health conditions are associated with long-lasting disability and significant mortality through suicide, medical illness, and accidental death. Nutritional interventions, as part of collaborative and integrative programs aimed at mental health promotion, contribute to positive health outcomes and are cost-effective. Comprehensive mental health promotion interventions that include nutrition education and food skills training components, with a focus on adolescents can lead to reductions in neural tube defects, low birth weight, and premature delivery, and can positively affect cognitive development, behavior, and academic performance. Based on literature there are common interrelated frameworks that help explain the interactions between the food we eat and the functions of the mind. These includes societal shifts, changes in the typical diet (processed foods), food insecurity, long-term effects of poor nutrition, stress and cortisol levels, genetics, antioxidants, energy and glucose metabolism. Known brain functions of selected major nutrients, vitamins, and minerals and nutrition-related strategies promote mental health and prevent mental health conditions. Moving forward, nutrition screening and assessment for mental health conditions should be screened for nutritional issues by the dietitian,. Every person has the right to health services that promote a healthy, mind, body and spirit.

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The COMFORT Cohort: Identifying Biomarkers Relevant to Functional Gut Disorders

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Keywords: Functional gut disorders · Diet · Symptoms · Biomarkers

The links between food, gut function and comfort, and mental well-being are at the forefront of nutritional research. Irritable Bowel Syndrome (IBS) is a functional gut disorder (FGD) and the combination of detailed patient reported outcomes (PROs) combined with omic data could better define these disorders. The Christchurch COMFORT cohort is a case-control study: 349 participants with FGDs (functional constipation FC, functional diarrhoea FD, IBS constipation IBS-C, IBS diarrhoea IBS-D) and asymptomatic controls. Demographics, symptom scores, psychological scores and dietary intake were recorded using: 'Modified Hunter New England'; Structured Assessment of Gastrointestinal Symptoms (SAGIS); Diet Diary and Live Symptoms Score (FAST); PRO Measurement Information System (PROMIS). Biological samples collected for an untargeted LCMS analysis of plasma samples and shot-gun metagenome analysis of faecal DNA. Symptoms questionnaire were able to cluster subjects into: IBS (42%), FGDs (18%) and healthy controls (40%). Within IBS, 46% were IBS-D, 23% were IBS-C and 31% were IBS-M. A higher score of health worry was reported in IBS-C than other IBS subtypes. HADS anxiety and depression scales were higher in IBS cases (vs. healthy controls). FAST correlated with PROMIS GI scales (exception for constipation). Metabolomic analyses detected differential plasma metabolites and pathways (bile acids, lipids, specific amino acids) affected within FGDs and between healthy and IBS. Metagenomics suggests that carbohydrate, methane, and sulfur metabolism may be important in IBS. These data will allow us to apply a systems biology approach to identify key pathways and correlate them with the questionnaire data to better understand FGDs.

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Nutritional Strategies to Build Immune Health in The Target Asian Market

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Keywords: Immunity · Microbiota · Metabolism · Pollution

As one of the pillars of the High-Value Nutrition National Science Challenge, the Nutritional and Systems Immunology research programme seeks to combine its research excellence with targeted consumer insight to (1) identify immune-related health conditions that are amenable to nutritional intervention with NZ food-derived bioactives; and (2) elucidate the associated mechanisms of action. Air pollution is epidemiologically linked to an increased risk of various morbidities, including respiratory viral

infections and metabolic disease. In particular, influenza A virus outbreaks have been reported coincidentally with periods of peak urban pollution. The strengthening of respiratory immune defences represents a fundamental need for the significant part of the Asian population that is dangerously exposed to poor air quality. It has recently been demonstrated that gut-resident microbes critically impact the immune system, both locally and systemically. The particular effect the gut microenvironment exerts upon the distant lung has been coined the "gut-lung axis". We performed pre-clinical and clinical studies to provide initial impetus for the development of nutritional strategies that harness the systemic reach of the gut microenvironment to improve respiratory health in the target Asian market. The Nutritional and Systems Immunology research programme further seeks to understand how the microbiota fine-tunes the peripheral immune system. This work is relevant for all immune-mediated diseases, including cadiovascular, metabolic and inflammatory diseases, and will provide insight into how diet, nutritional bioactives and the microbiome interact to influence human immunity and physiology.

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Feeding through Seeding: Nourishing the Infant Microbiome that Supports Immune Health

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Keywords: Infant · Immune · Microbiome · Systems biology
One of the four long-term HVN research axes is infant health with a spotlight on gut microbiome around weaning, which is a period of marked physiological change. The introduction of solid foods and the changes in milk consumption are accompanied by significant gastrointestinal tract, immune and developmental adaptations. Recent discoveries have highlighted how the infant immune system co-evolves with GI microbiota in a mutualistic relationship, a crucial event that impacts on the host's immune system throughout life, and how aberrant GI microbiota during infancy is associated with disease conditions later in life. Our programme aims to investigate the establishment of immune protection-beneficial microbiomes during and after the introduction of solid food. To date we have conducted two studies; (i) mined public data of bacteria with supporting evidence for beneficial modulation of the evolving infant GI and systemic immune system and identified lead candidates to feed these beneficial bacteria, (ii) conducted a pilot clinical trial, with experimental (prebiotic) complementary feeding diet (kumara) informed by (i) plus a probiotic control. Findings from the pilot study suggest that it is feasible to feed an identified prebiotic candidate to infants from the commencement of weaning until 12 months of age and to deploy a systems biology approach to examine the modulation of the microbiota and immune system.

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New Horizons for the Forgotten Generation: Addressing the Double Burden of Malnutrition among Adolescents

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Keywords: Adolescent Nutrition · Double-Burden of Malnutrition · Indonesian adolescents · Social and behavioral change communication
The double burden of malnutrition, defined as the coexistence of undernutrition and overnutrition, is a global public health concern affecting all countries and age groups. Adolescents in low and middle-income countries are among the hardest hit and an important target group for early interventions. The changes in dietary intake and physical activity patterns associated with globalization, industrialization, and urbanization are known to have contributed to the epidemics. Yet, adolescents have so far been one of the most neglected age groups, with few programmatic and policy actions targeting to improve adolescent nutrition. The symposium aims to unfold the epidemiology of the double burden of malnutrition among adolescents in Asia and highlight the potential multi sectoral and gender responsive package of interventions, actions and solutions. The keynote speaker, Dr. Parul Christian, will present the prevalence, causes and consequences of the double burden of malnutrition among adolescents, and review the effectiveness of existing double-duty actions. The multi-sectoral panel discussion will then stocktake recommended double duty actions to be taken by the government, international development partners, civil society organizations, and business sector, and define knowledge gaps and research needs. Specifically, the importance of co-locating nutrition-specific and nutrition-sensitive interventions in a holistic and synergistic manner, and employing effective, sustainable social and behavioural change communication strategy and interventions will be highlighted. The symposium will also engage adolescents to hear their voice on key nutritional issues and encourage youth and adolescent participation to future programming and actions.

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Achieving Improved Nutrition in a Sustainable Way – The Case of Increased Egg Consumption

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Keywords: Egg · Improved nutrition · Food
Food innovation is important and needed in light of the still persisting malnutrition problems globally and in particular amongst low-income consumers. It is widely documented that low- and middle-income consumer struggle to achieve a daily intake of a nu-

tritious diet which provides the essential macro and micro-nutrients needed for a healthy life; it is also widely documented that nutritious foods or nutrient-dense foods are more expensive than less nutritious, more calorie-dense foods; studies have documented that nutrients are less expensive in the Western developed world than in less developed and emerging economies. The symposium will not only talk about food innovation but will in particular highlight and debate business models that make nutrients less expensive so that low- and middle-income consumers can have access to those essential nutrients in a sustainable way. The case of increased egg consumption will be the title of the symposium. Examples will be showcased by the involved partners, ranging from government, private sector, UN, civil society and academia.

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Global Significance of Rice and Rice Bran Oil in Human Health Promotion

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Keywords: Rice · Rice bran oil · Phytonutrients · Tocotrienol · Health promotion

Rice (*Oryza sativa* L.) is one of the big three grains of the world. Half of the population of the world eats rice as the staple food. We need to pay more attention to the breaking rice bowls caused by the climate change. White rice is good source of energy, and most of bioactive compounds (phytonutrients) are in rice bran. Rice bran provides rice bran oil (RBO) containing essential fatty acids, triacylglycerol, tocopherol (VE), tocotrienol (T3), ceramide (cerebroside), phytosterol, gamma-oryzanol, ferulic acid, inositol and rice bran protein. Asian countries are expected to increase the production of rice and RBO in their health promotion. RBO T3 inhibits hypoxia-induced VEGF secretion and IL-8 expression in cancer cells, and thus contributes to preventing tumor growth. The price of medicines, including new medicines, is rising rapidly, which put the social security and health care systems in many countries at risk. It is also happening in Japan. We should work toward creating a society where people can enjoy longevity till 80, 90, and 100 years old or more with proper food intake, not relying too much on the medication.

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Nutrient Profiling for the Promotion of Healthy Eating in the Asia-Pacific Region: Theory and Practice

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Keyword: Nutrient · Profiling nutrient density · Sensory appeal · Food choice

NP models to the needs of Asia-Pacific countries requires some conceptual rethinking. First, nutrient shortages (and excesses) are not the same in LMIC as in HIC; there are also important differences by geography, religion, culture, and socioeconomic status. As dietary guidelines globally have shifted from individual nutrients to composite food patterns, it may be time for NP models to do the same. Hybrid NP models that are both nutrient- and food-based can assign additional scores to healthy foods or selected dietary ingredients. As plant-based diets are more common in LMIC than they are in HIC, NP models will need to take protein sources into account (meat, dairy or plant), and consider both nutrient bioavailability and the presence of dietary anti-nutrients. Given cultural uses of multi-ingredient meals it is imperative that NP models capture nutrient density of dishes and food patterns and not just individual foods. Finally, whereas NP models have been used to calculate the monetary and environmental cost of both calories and nutrients, one important driver of food choice is still missing: the present goal is to establish a methodology for deriving a relation between nutrient density of foods and eating pleasure. New hybrid NP models can help identify foods and cooked meals that are nutrient-rich, affordable, culturally appropriate and with a wide sensory appeal.

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The Practical Application of Nutrition Profiling Systems for Public Health

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Keyword: Nutrient Profiling · Public health policies · ATNF

A variety of NP models are now used by governments, industry and civil society groups for a wide range of health-related purposes, including the development and execution of public health policies, competitive benchmarking, loyalty and wellness programs, and assessing CSR performance. Additionally, standardized ways to assess foods across geographies are increasingly valued by users. The George Institute's FoodSwitch program has built a nutrient composition database for more than 700,000 foods across 9 countries. With the application of NP to this data we are helping consumers, global food companies, private health insurers, national governments and NGOs with the practical means to assess and develop tangible outcomes to improve dietary health. For example, within a country, the FoodSwitch app provides consumers with a Health Star Rating (HSR) of a food item by scanning its barcode.

It will also suggests healthier alternatives based on its NP. Similarly, the application of NP systems across country level data provides the means for the Access to Nutrition Foundation (ATNF) to benchmark the portfolios of global food companies to encourage improvements to their foods. Discovery, South Africa's largest life and health insurer, uses FoodSwitch data within its industry leading Vitality wellness program – that incentivizes and rewards healthier eating. NP offers a solid basis for analysis and tangible ways for industry and government to make improvements to the food environment and to help impact healthier food choices and diets

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Update on Evidence, Policy, and Practice: Multiple Micronutrient Supplementation (MMS) for Pregnant Women

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Keywords: Multiple micronutrients · Pregnant women
Poor nutrition during pregnancy is a major global health problem due to increased requirements for micronutrients to support maternal and fetal growth and development. Ensuring adequate nutrition in pregnancy can significantly improve maternal health and survival, the likelihood of a successful pregnancy, and the lifelong health and development of the child. **Objective:** To provide an update on the status of the evidence, policy, and practice related to MMS during pregnancy. **Methods/Results:** Symposium topics will cover the: i) evidence, an overview of the latest evidence surrounding the efficacy of MMS for pregnant women, including a review of recent meta-analyses and other original research articles; ii) global and national policy, an overview of the current WHO recommendations, Global Taskforce for MMS for Pregnant Women guidance documents, and plans for moving forward an agenda and global/Indonesian policies that allow for the scale-up of MMS; iii) practice in Indonesia, an overview of the on-going/planned demonstration projects to accelerate country-specific and global efforts to stimulate the effective uptake and scale-up of MMS during pregnancy. **Conclusion:** A moderated panel discussion and closing remarks will summarize the importance of maternal nutrition, and for the provision of MMS during pregnancy.

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Wholegrain Oat has a Long History of Goodness

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Keywords: Whole grains · Oats · Beta-glucan
Oat, Avena sativa, now ranked sixth in the world production of cereals, has had a humble beginning. Apparently originating as a weed that affected other crops, it was the last of the major cereal grains to be domesticated, around 3,000 year ago. Oat has now become an important commodity in many cultures, including in Asia. Oat is a whole grain with all the three parts of the grain intact, ie bran, germ and endosperm. It has a higher protein than other grains and more than three-quarters of the lipid it contains is mono- and polyunsaturated fats. Oat is a good source of several vitamins and minerals. It contains dietary fibre as well as a unique fibre, beta-glucan. Another important healthful feature is that it contains several phytonutrients. These healthful ingredients provide many health benefits, including lowering blood cholesterol, improving cardiovascular health, help control blood sugar and for better gut health. Including oat into the daily diet can contribute towards meeting the dietary guideline recommendation of increasing whole grain intake. There are many types of oats in the market to meet the different needs and preferences of the consumer. These are all whole grains and processed differently to produce the old fashioned, steel-cut, rolled/quick cook, and instant oats. Oat is also a highly versatile ingredient that can be easily adapted in all kinds of meals. Contrary to some belief, oats is not just for the elderly and the sick, but can be incorporated into the diet of people of all ages.

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The Health Benefits of Oats

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Keywords: Oat · Cholesterol-lowering · β-glucan · Avenanthramides
The landmark approval of a health claim for oats in 1997 by the United States Food and Drug Administration (FDA) marked the first food specific health claim. The FDA had concluded that an intake of at least 3 g β-glucan from oats as part of a diet low in saturated fats could help reduce the risk of heart disease. Of importance is that the oat health claim signifies for the first time recognition by a public health agency that dietary intervention could be beneficial in disease prevention. The unique chemistry and nutritional composition of oats suggest that the benefits of oats may not be confined to just a cholesterol-lowering effect. More recently, research has focused on the impact of oat intake on other health outcomes beyond the lipid lowering effect, such as blood pressure, body mass index and weight, glucose metabolism and type 2 diabetes, as well as caloric regulation and satiety. To identify mode of action, recent efforts have focused on isolating, identifying, and characterizing the bioactive constituents unique to oats in addition to b-glucan. Compared to other whole grains such as corn, wheat,

and rice, oat nutrition profiles are uniquely "complete" across many constituents, ranging from nutrients to phytochemicals and bioactive compounds. Nutritionally, oats provide many essential nutrients. On a 100 g basis, oats are a significant source of dietary fiber, soluble fiber mostly as b-glucan, thiamin, folate, iron, magnesium, copper, and zinc. Additionally, oats are an excellent source of potassium and are low in sodium, with a Na:K ratio less than one. Avenanthramides are phytonutrients in oats known to have anti-inflammatory and antioxidative activity and may be involved in some of the health effects unique to oats. As of 2018, ischemic heart disease (number 1 ranking) and stroke (number 2 ranking) were two of the top 12 world health problems that could be favorably affected by oat consumption. Important risk factors recently highlighted by the Global Burden of Disease Study that could be affected by oats include high blood pressure, high body mass index, and high fasting blood glucose levels as well as an elevated LDL-C level. Recent advances in research have focused on oat chemistry and nutrition with the goal of demonstrating the mode of action. In all, the health benefits of oats can be attributed largely to their unique chemistry and nutrient profile.

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The Cholesterol-Lowering Effect of Oats in an Asian Population

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Keywords: Oats · β-glucan · Total Cholesterol(TC) · LDL Cholesterol(LDL-C)

Background/Aims: Context and Objectives: Coronary heart disease (CHD) is the most common type of heart disease while elevated total cholesterol (TC) and low-density lipoprotein cholesterol (LDL-C) are major risk factors for CHD. Numerous clinical studies showed that oats/oats β-glucan have the benefits of lowering cholesterol. However, the majority is conducted on western population and there is lack of evidence from Asian population. This study is aimed to determine whether consumption of oats with ≥ 3 g oat β-glucan/d would reduce cholesterol level among Chinese population with marginal high cholesterol, and provide the scientific evidence on dietary recommendation of oats' effectiveness on lowering blood lipids. **Method:** A randomized controlled and parallel-design multicenter clinical trial was conducted. 210 subjects with marginal high cholesterol were screened and randomly divided into test group and control group. Each subject consumed either 80 g/d oats with ≥3 g β-glucan or 80 g/d rice (twice/day) for 45 days. Results 94 subjects in oats group and 93 subjects in control group followed the diet intervention requirements to complete the trial. At the beginning of the study, there was no significant difference for blood lipids, BMI, ages and gender between oats group and control group. After 45 days intervention, oats intake resulted in a significant reduction of TC, LDL-C and Non-HDL-C at 45 days in comparison to the baseline.

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Incorporating Whole Grain Oat to Traditional Southeast Asian Diets: A Public – Private Partnership Approach

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Keywords: Oats · Beta-glucan · Recipes · Diet

Oats are a whole grain that has been recognized to be nutritious, attributable to its high content of numerous components, namely dietary fiber, vitamins and minerals and phytonutrients. Oats are easily obtained, simple to use, can be prepared quickly and versatile enough to be creatively used in many delicious recipes. Oats can therefore be an ideal choice for inclusion in daily diets that meet dietary recommendations to increase consumption of whole grains for improved health. An ideal approach would be to incorporate oats into meals with which the community is familiar. Based on this concept, the cookbook entitled Healthy Cooking with Oats – Recipes from Southeast Asia was conceptualized. Volume 1 was published in 2017 and includes 45 different oat-based recipes from Malaysia, the Philippines and Thailand. Volume 2 will be published later this year, with 30 recipes from Indonesia and Vietnam. The recipes are well-known and traditional dishes from the five countries but were modified to incorporate oats. The recipes include those for breakfast, main dishes, snacks and desserts. This first-of-its-kind recipe book is an example of a multi-stakeholder, public-private collaboration. It is a collaboration of five nutrition professional organizations and academic institutions in Southeast Asia, namely the Nutrition Society of Malaysia (NSM), the Institute of Nutrition Mahidol University (INMU), the Nutrition Foundation of the Philippines (NFP), the Food and Nutrition Society of Indonesia (PERGIZI PANGAN) and the Vietnam Nutrition Association (VINUTAS) and has been published in collaboration with an unconditional educational grant with PepsiCo Services Asia Ltd. PepsiCo is the parent company of Quaker. The cookbook is an effort of the collaborating partners to promote healthy nutrition, through consumption of nutritious foods and adopting nutritious cooking methods.

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How to Make The Healthy Choice The Easy Choice?

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Keywords: front-of-pack labelling, NCD, prevention, consumer education, reformulation

Background/Aims: Global developments have drastically changed the food environment, which impacts consumer's food choices in an unprecedented way. It has become more difficult for consumers to choose healthy foods, especially when food marketing drives unhealthy choices. Such consumer choices might result in a detrimental health outcome in the form of non-communicable diseases. The key to prevention of such non-communicable diseases is by following dietary recommendations. But how do pre-

packaged and processed food products fit into this picture? Hence, it became imperative to design a set of criteria based on dietary recommendations for the pre-packaged foods available to the consumers. This shaped the starting point for positive labelling programs. A set of criteria has been developed, to identify the healthiest products in each food group. The objectives of these criteria are to guide consumers to healthier products, through the front-of-pack logo program; to develop a reformulation agenda for food companies; to help health authorities to create a high level of coherence in their nutrition policies. This approach has been the starting point for the development of positive labelling programs in a number of East-Asian countries, with support of the Choices International Foundation. Although the logos might look different, yet, they share the same principles of providing a positive message to consumers; the logo should be known, understood, appreciated and used by consumers; a high level of simplicity; product group specific criteria to help companies to benchmark, reformulate and innovate their products; development of the criteria by an independent scientific committee; aligning with the national food culture and endorsed by their respective stakeholders and international collaboration, to facilitate international trade and to exchange information

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The Promotion of Healthier Choice in China

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Keywords: Positive FOP labels · Limited indexes · Food-category-specific approach · Standard

The incidence of obesity and NCDs in China are rising at an alarming rate. Positive front-of-pack (FOP labelling is one of the actions that are implemented to help curb this phenomenon.

Since 2008, supported by the national food composition monitoring program, Professor Yang's team in National Institute for Nutrition and Health of Chinese CDC began to collect the information and set up a database on saturated fat (SFA), trans fat (TFA), sodium and total sugars levels in prepackaged food. Based on the Choices criteria and approach, the positive FOP labels were created to use simple nutritional information to help consumers make healthier food choices. In 2017, CNS released the group standard "labeling specification for healthier choice in prepackaged food" as national healthier choice label. According to the characteristics of Chinese residents' food consumption, components (the content of total fat, saturated fat, trans fat, total sodium/salt, total sugars or added sugars per 100 g /100 mL of food) in a food product with a negative impact on health were taken as limited indexes. The thresholds of these limited indexes were formulated by a food-category-specific approach, in which 32 subclass of food groups were identified from 10 major ones including processed cereal and grains, processed beans and legumes,dairy products, seeds and nuts, processed meat and meat products, aquatic products, egg products, products of vegetables and fruits, beverages and the others. The "healthier choice" LOGO can be voluntarily labeled for food categories that meet the requirement of the thresholds. The group standard has received high attention from different stake-

holders including the scientific community, industry, government and media after it was launched. Meanwhile the Chinese government released the national nutrition plan (2017–2030) in 2017, calling on the food industry to reduce the amount of oil, salt and sugar in prepackaged foods. It also supports the CNS in developing the national standard of "FOP nutrition labels of prepackaged food" based on the group standard which has being implemented for a year.

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Market Impact of Singapore's Voluntary Nutrition Labelling Programme

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Keywords: Labelling · Health · Food product

The Healthier Choice Symbol (HCS) aims to assist consumers in identifying healthier food products. The intent is to encourage consumers to switch to healthier alternatives by shifting norms and lightening palates. Therefore, the guidelines have been developed as a moving target to allow consumers to change and adjust their palates over time. At the same time, it incentivises and encourage food manufacturers to continue to reformulate and increase the availability of healthier products in the market. HPB is committed to shift the market toward healthier choices by leveraging on industry partnerships to grow the supply as well as to increase accessibility to healthier products through multi-channel demand generation. As a result of the multi-partnership approach with different stakeholders, there are now about 300 food manufacturers participating in this programme with almost 3500 food products carrying the symbol. Demand for HCS products has been gaining momentum growing at a yearly average of 6% in sales volume, with the market share of HCS products increasing from 15% in 2012 to 25% in 2018. In conclusion, the use of HCS labelling scheme in Singapore has shown to be effective in incentivising food manufacturers to develop healthier food products, and influencing consumers to choose healthier food products.

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Regulation on Nutrition Labelling in Indonesia

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Keywords: Indonesia · Nutrition labelling · Front of Pack

The prevalence of Non-Communicable Diseases (NCDs) in Indonesia is currently increasing. Based on data from Basic Health Research (2018), the highest prevalence of NCDs were hypertension (34.1%), obesity (21.8%), diabetes mellitus (10.9%), and stroke (10.9%). The main risk factors of NCDs are caused by unhealthy diets and lack of physical activity. An unhealthy diet often associated with excessive consumption of sugar, salt, and fat, Total Diet Survey data (2014), showed those excessive consumption respectively 4.8%; 52.7%; and 26.5%. Labelling is one of the strategies

recommended by WHO in NCDs prevention, through labelling consumers would be better informed regarding the benefits and content of the food they consumed. WHO also stated that the trend of health-related claims in the label is increasing, thus providing important consequences for the government to guarantee that the claims are true and not misleading. Indonesia has developed Head of BPOM Regulation No 31 Year 2018 on Processed Food Labelling which stipulated that nutrition information on processed food is mandatory. Furthermore, to ease consumers in interpreting the nutrition content of the product, BPOM also developed the front of pack nutrition labelling, and currently is voluntarily implemented. Thus, BPOM is drafting a technical regulation for the implementation of nutrition information provision. The draft covered mandatory nutrient such as energy, fat, saturated fat, carbohydrate, protein, total sugar and salt (sodium), the exclusion of processed food from mandatory nutrition information, and type of front of pack nutrition labelling which are monochrome format and a healthier choice logo. We expect that those regulations could encourage industries to produce food with better information, and also encourage consumers to make a better choice of foods that may affect their health.

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Thailand Experiences on Healthier Logo Implementation

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Keywords: NCD reduction · Nutrition labelling · Nutrition strategy · Consumers

Type Front of Pack nutrition labeling has been implemented in Thailand since 2016 on voluntary basis with the supports from Thai Health (NGO for healthy lifestyle promotion) and Thai FDA. The paramount of this program is to reduce the NCD problem in the Thai population by changing their eating habits via nutrition education and increasing food products of healthier nutrient profiles in the market. Initially, there were the nutrient criteria only for 5 industrial food groups, which later expanded to 10 food groups in 2019. At present, the labeling or so called "Healthier Choice" logo has been granted to 1,019 food products from 175 companies. There are 415 food products with the Healthier Choice logo being sold in the market. The budget from Thai Health has been mostly spent on technical activities i.e. criteria development, extension service and post-marketing monitoring. In term of interests from food industries, the program was doing quite well during the past 3 years, which could be observed from increasing numbers of registered and market-launched products as well as industrial requests for nutrient criteria of new food groups. The products that are using the logo are mostly produced from medium and large-scale industries but not yet from small and cottage industries. The concern for the "Healthier Choice" logo implementation is on the logo visibility and use among consumers. In fact, the main budget expenditure has already been on the logo promotion, which was partly supported from Thai FDA and largely spent product-wise by local and multinational food companies. The recognition on the logo among consumers is still not so well

since industrially-produced food products contribute only 20% of the diets of the Thais. Implementation the logo into foods being sold in franchise coffee shops, convenient stores and restaurants as well as served at the hospitals is therefore the new strategy for increasing the logo visibility.

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The Implementation of Healthier Choice Logo in Malaysia

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Keywords: Healthier Choice · Logo · Product Reformulation · Consumers

The implementation of Healthier Choice Logo Malaysia (HCL) was started in 2017 as one of the initiatives to create an environment that support healthy eating practices among Malaysians. The Healthier Choice Logo enables consumers to quickly identify healthier products within the same category of food. It also encourages industries to reformulate their product, to make it healthier. At the moment, there are only 370 products with HCL in Malaysia. Commitment from industries is crucial in ensuring more products with HCL are available to consumers. The consumers also need to be educated on HCL and the importance of choosing healthier products.

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The Double Burden of Nutrition Challenge and Need For Healthy Food Choice Labeling in Viet Nam

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Keywords: Double burden · Nutrition · Healthy food choice · Viet Nam

Viet Nam is facing the double burden of nutrition. The prevalence of stunting remained at 23.8% in 2017. Micronutrient deficiencies (iron, zinc, vitamin A, iodine) have been significant public health problems. About one-third of vulnerable groups are anemic and it was not changed in 2000–2015. Particularly, zinc deficiency was affecting 63.3% of women reproductive age, 69.4% under-five children and 80.3% pregnant women in 2015. Besides, noncommunicable chronic diseases have rapidly increased and accounted for 77% of morbidity. National STEPS survey in 2015 showed that 20.3% of the adult were hypertensive, the prevalence of elevated glucose was triple and diabetes increased 63% in 5 years, 30% adult had high blood cholesterol. Adult overweight and obesity was 17.5%, increased more than 5 times after 15 years. Dietary risk has been recognized as the leading risk factor of disease burden in Viet Nam. Salt intake was double recommended level, 57% of adults consumed insufficient fruit and vegetable, consumption of sugar and sugar-sweetened beverage, processed food increased. National Strategy of Prevention and Control of Chronic Disease 2015–

2025 identified the objectives of reducing nutrition-related chronic disease's risk factors such as salt intake, vegetable and fruit consumption, hypertension, high blood cholesterol, and high blood glucose. Increasing awareness, knowledge and practice of general population on healthy food and reformulation of food products to reduce risk factors and/or enhance healthy factors are important matters to be implemented. However, there is no regulation on nutrition labeling in place. In this context, healthy food choice labeling becomes a crucial solution to attain healthy diets.

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Low Glycemic Index Foods for Metabolic Health: Fact or Fiction?

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Keyword: Type 2 Diabetes · Isomaltulose · Glycemic control · Asian Phenotype

We are in the midst of a global food revolution – A revolution driven by consumer demand for "healthy foods". Nutrition and health have taken center stage in our lives – no time in human history has food manufacturing been driven by nutrition as we are witnessing today. In response, the food industry has evolved several strategies to develop foods with specific health benefits over and above its nutritional content. Asia is in the grip of a pandemic in Type 2 diabetes and chronic disease. It is also the epicenters of Type 2 diabetes. Of the 450 million Type 2 diabetics diagnosed worldwide, approximately 50% live in this region. The prevalence of Type 2 diabetes has been partly ascribed to the high carbohydrate (CHO), high glycemic response diets that people in this region consume. The presentation will highlight how food ingredients can play a central role in the management of chronic diseases (notably diabetes and obesity). Examples of such ingredients covered in this presentation will include Isomaltulose, beta glucan and polyphenols. Over the next few decades, Asia will provide global food companies with their biggest growth opportunities and most innovative challenges. The need for global companies to innovate and renovate food that meet the cultural and taste preference of Asians will also be highlighted.

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State of Play on Reformulation in Asia

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Keywords: Healthier product reformulation · Consumer attitudes · Industry progress

With the growing policy pressures in light of addressing the rising rates of malnutrition; the food industry has been working to deliver solutions through product innovation and reformulation to nudge healthier behaviours by improving the nutritional quality of its food products. However, as innovation and reformulation efforts are carried out by individual companies behind closed doors albeit being continuous and widespread; FIA in partnership with IGD sought to understand the reformulation landscape in some of the key markets in Asia, including Singapore, Malaysia, Thailand and India. This session seeks to share the findings of the research on consumer attitudes towards healthier product reformulation, industry's progress, priorities and gather several key experts from the industry and academia to discuss the challenges and opportunities present to deliver healthier solutions to the under and over-nourished populations in Asia.

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Scaling Up the Integrated Management of Acute Malnutrition to Address the Burden of Acute Malnutrition in Asia

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Keywords: Severe Acute Malnutrition · Integrated Management of Acute Malnutrition · Young children nutrition · Undernutrition

Worldwide an estimated 51 million children under 5 are wasted, of which nearly 35 million are living in Asia. Notably, severe acute malnutrition (SAM) is considered the most dangerous form of child malnutrition, as children with SAM are 11 times more likely to die than those who are well-nourished. The integrated management of acute malnutrition (IMAM), including both facility-based and community-based treatment, is a proven, life-saving intervention. However, while the facility-based SAM treatment has been a standard component of health services for many years, its coverage and quality of care has remained low in most Asian countries. Conversely, the community-based treatment of uncomplicated SAM has been proven to maximize the coverage and successful treatment of children with SAM, but this service is yet to be scaled up to national coverage in many Asian countries. This symposium aims to review the epidemilogy of SAM and IMAM program experience particularly in Asia, and highlight challenges, success factors, and lessons learned from IMAM scale up experience. UNICEF Nutrition Advisor from the East Asia and Pacific Regional Office, Christiane Rudert, will highlight the global and regional buden of SAM, review the current status of IMAM programme implementation in Asia, and present selected case studies from countries where IMAM has successfully been scaled up to national coverage, and highlight key lessons to be learned from the successful IMAM scale up experience. Then, the keynote speaker will bring the focus to Indonesia, highlight the burden of wasting in Indonesia, review IMAM implementation status, and discuss relevant facilitators and challenges.

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Food and Nutrition Security During Natural Disaster Crisis: Indonesian Experience

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Keywords: Natural disaster · Malnutrition · Habitual eating pattern

Being located on the area with a high degree of tectonic activity (called the Pacific Ring of Fire), Indonesia has to cope with the constant risk of volcanic eruptions, earthquakes, floods, and tsunamis such as in Jogjakarta, Aceh, and recently in West Nusa Tenggara & in Palu. Most of the disasters produce food shortages which are so severe as to have a critical impact on the nutritional status of the affected population. It is necessary, however, to plan for the treatment and management of cases of malnutrition that existed prior to the disaster or which have become acute, and will become evident during emergency period. Feeding the survivors of the disaster to ensure an appropriate diet, is a very challenging circumstance. The objective is to ensure safety and prevent the transmission of food-borne disease in spite of nutrient requirement fulfillment. As an immediate measure, provide any population group that is or appears to be at high nutritional risk. The important thing at this stage is to provide a sufficient quantity of energy, even if it is not a balanced diet. For a short period of time, 1700–2000 Kcal per person/day will prevent severe deterioration of the nutritional status, and famine. The food should be part of the food pattern of the population. Another challenge in food management during the relief period is that most of the food aid are instant and processed food which need adjustment to the habitual eating pattern of the population.

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Management of Nutrition in Emergencies: Importance of Protein and Amino Acids

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Keywords: Protein · Amino acid · Earthquake

Stockpiled foods and food aids are heavily dependent on carbohydrate and lack of protein. Since the Great East Japan Earthquake in 2011, Japanese Government has issued "Nutritional Reference Values for Feeding at Evacuation Shelters"(hereafter, the values) in every large natural disaster, but the energy and nutrient contents in a typical set of foods stocked by local governments do not meet any of the values. If a person does not eat enough, she uses her muscles to provide protein as fuel for energy. In order to prevent losses of muscles, we must eat enough energy and protein. In a crowded shelter where it is cold without heating and unhygienic without running water and garbage collection, the body uses protein to fight commonly observed respiratory and gastrointestinal infections. The largest part of vulnerable people in Japan is elderly, accounting for 28% of the population. Among the elderly, 13% of males and 20% of females have a tendency for undernutrition from normal times. They cannot eat hardtacks because of their impaired masticatory function. They are also at a high risk of aspiration pneumonia which accounts for a large part of disaster-related deaths. Protein deficiency causes a pressure ulcer in inactive lifestyles at shelters. Given that the value for energy is lower in elderly but its value for protein (55 g/d) is the same as younger adults, elderly people need to consume nutrient-dense foods. Functional foods and commercial liquid meals for elderly that are ready-to-eat and fortified with protein are highly recommended in disasters.

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Frontiers in Disaster Nutrition: Disaster Dietitian and Disaster Food Certification for Nutritional Health Care

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Keywords: Food certification · Health care · Food disaster

Nutritional health care is important not only normal period but also emergency period such as natural disaster. Especially, the care of nutritionally vulnerable evacuees is the first priority. In the Great East Japan Earthquake 2011, many nutritionally vulnerable groups were infants and the elderly. Disaster Dietitian, to provide nutritional health care at actual sites within the disaster-affected areas, the Japan Dietetic Association (JDA) established the Japan Dietetic Association-Disaster Assistance Team. The JDA-DAT is a nutrition support team that received training in the specialty of nutrition care activity in disaster-affected areas. The purpose of this team is to arrive at disaster sites within 72 hours and provide nutritional support for the disaster-stricken region in cooperation with medical, welfare, and government nutrition specialists, etc., when a large-scale natural disaster, such as a major earthquake or typhoon, strikes anywhere in Japan (or overseas). Now, more than 2,700 members are already trained. Disaster Food Certification, Japan Disaster Food Society started a certification system of "Japan Disaster Food" in 2015. Disaster foods are extensions of daily diets. All the foods and drinks conservable at room temperature are available as disaster food. Now, more than 110 items are already certified. Such systematic and large-scale dietary support after a disaster is rare, even worldwide. Nutritional care of evacuees could be partially improved by being better prepared for disasters.

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Introduction: About SEA -PHN Network – Rationale, Objectives, Operational Framework, Key Network Activities, Main Projects – Completed and On-Going

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Keywords: Nutrition societies · Public health nutrition · Multistakeholder · Public-private partnership

Background/Aims: The Southeast Asia Public Health Nutrition (SEA-PHN) Network, established in 2014, is a network among five nutrition societies/associations in the region, namely Food and Nutrition Society of Indonesia, Nutrition Society of Malaysia, Nutrition Foundation of the Philippines, Inc., Nutrition Association of Thailand and Vietnam Nutrition Association. In the spirit of public-private collaboration, five corporate companies have been collaborating with the Network by providing financial support and technical input that are strictly not for commercial interests. This unique partnership is aimed at establishing and maintaining an interactive network, promoting periodic exchange of activities as well as participate in collaborative public health nutrition projects. A council, comprising presidents of the partner societies/associations was established to manage the activities of the Network. This Symposium presents the key achievements of the Network since its inception. Regular meetings have been organised, rotated among the member countries and participated by Council members, corporate partner technical representatives and senior government officials. A website (www.sea-phn.org) has been established to serve as repository of various available nutrition documents in the region. Several major projects have been completed, including organising the 1st Public Health Nutrition Conference in SEA in 2017, publication of a review and analysis of food-based dietary guidelines (FBDGs) and nutrition policies and action plans (NPANs) in SEA, and implementing a multi-country school nutrition education initiative. This multi-stakeholder multidisciplinary effort of the SEA-PHN Network will continue to conduct collaborative projects amongst members of the Network and corporate partners to support government efforts in community nutrition improvement.

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Food-Based Dietary Guidelines in SEA Countries

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Keywords: Food-based dietary guidelines · Key message · Pictorial guide · Scientific rationale

This project of the SEA-PHN Network analysed the officially published food-based dietary guidelines (FBDGs) of six countries in SEA, namely Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam. The key messages, pictorial food guides adopted, associated explanatory notes, and scientific rationale were extracted and analysed for similarities and differences. Similar key messages were grouped together by topics. Twelve out of the 17 topics identified are present in at least four of the FBDGs studied, e.g. eat a variety of foods; consume more fruits and vegetables; consume adequate amounts of milk and milk products; limit foods high in sugar, fat and salt; and maintain healthy body weight. The commonalities of the key messages in most countries indicate the similarities in the nutrition problems in the region. The documentation of scientific rationale varies considerably but the scientific rationales used to substantiate key messages are rather similar for most topics. Pictorial food guides are adopted by all six countries, with food pyramid being the most common pictorial guide, adopted by four out of six countries. While differing in their visual presentation and minor details, they are similar in their essential attributes in conveying the message of balance, variety and proportionality among the major food groups. More similarities than differences in the FBDGs indicate possibility for greater collaboration among the countries in the region particularly in the development, as well as working together towards effective dissemination, promotion and implementation of FBDGs. This compilation serves as a useful reference for countries developing or reviewing FBDGs.

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Good Nutrition – Key to Healthy Children, A Multi-Country School Nutrition Initiative: Rationale, Concept and SEA-PHN Network Nutrition Education Package

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Keywords: School children · Nutrition education package · Dietary guidelines · Physical activity

The prevailing dual burden of malnutrition among school-age children in Southeast Asian countries calls for urgent need to pro-

vide them with appropriate nutrition interventions, especially empowering children with nutrition knowledge. Both undernutrition and overnutrition at this age have detrimental impacts on the development and health of children in later adulthood. Recognising this, Southeast Asia Public Health Nutrition (SEA-PHN) Network initiated "Good Nutrition – Key to Healthy Children (GNKHC)", a unique multi-stakeholder, multi-country nutrition education initiative for school-going children. All five member countries of the Network participated in this initiative, namely nutrition societies/associations of Indonesia, Malaysia, Philippines, Thailand and Vietnam. The project commenced with jointly developing a nutrition education package which comprised nine topics in food and nutrition based on the dietary guidelines of the countries, teaching aids for interactive activities and games, student's workbook and educational leaflets for parents. All countries utilised the same developed nutrition package, monitoring tools and followed the same implementation protocol. However, the contents were translated into the appropriate national languages and customised to meet local social and cultural practices. Technical working groups, overseen by national nutrition societies were established within each country to manage the implementation of the project in their respective selected schools. The developed educational package has been implemented in selected schools across all five member countries. It is hoped that SEA-PHN Network education package can be utilised in more schools in the region, to promote healthy dietary habits and a physically active lifestyle for the prevention of malnutrition in later years.

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Good Nutrition – Key to Healthy Children, A Multi-Country School Nutrition Initiative: Implementation, Key Findings and Learnings

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Keywords: Nutrition education programme, school children, KAP, training-of-trainer

Southeast Asia Public Health Nutrition (SEA-PHN) Network conducted "Good Nutrition – Key to Healthy Children (GNKHC)", a multi-country nutrition education programme for school-going children. The nutrition package was implemented via a 2-step process. A training-of-trainer (TOT) workshop was first organised to train the teachers to be familiarised with the package and implementation process (including evaluation). In the second step, the trained teachers rolled out the nutrition education lessons in pre-identified schools. Two schools, with about 100 primary three students (9 years old) from each school, were selected for the initial phase of implementation in all five countries of the SEA-PHN Network. Teachers were given a set of timeline to complete the teaching of the module in one year. The programme commenced at different times depending on the school year of each country and some are still in the midst of completion. Nutrition knowledge,

attitude and practice (KAP) of the students were assessed pre and post activity. Teachers and students provided feedback that the lessons were interactive and educational. The challenges of this programme include getting commitment from the teachers to complete the lessons within one year. It was also challenging for teachers to find time to conduct the lessons during school hours, as this programme is not part of the formal school syllabus. It is hoped that experience gained in the implementation of GNKHC can be used for implementing larger scale interventions in more schools to empower school children with knowledge on healthy eating and active living.

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National Plans of Action for Nutrition in SEA Countries

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Keywords: National plan of action on nutrition · Nutrition intervention programmes · Implementation strategies · Monitoring and evaluation·

Background/Aims: The SEA-PHN network reviewed the National Plans of Action for Nutrition (NPANs) and related documents in Indonesia, Malaysia, Myanmar, Philippines, Thailand and Vietnam to provide an understanding of the approaches undertaken by Southeast Asian countries to formulate NPANs as well as the similarities and differences in various NPAN components. These countries recognised the persistent undernutrition and escalating rates of obesity and other diet-related chronic diseases as the key drivers for nutrition action plan implementation. The prioritisation of nutrition interventions outlined is based on respective country context and needs. Although differing in implementation strategies and targets set, these countries show similarities in several components including objectives (emphasis on improving nutritional status of the population; preventing/reducing undernutrition and diet-related non-communicable diseases NCDs; improving food and nutrition security), stakeholders involvement, nutritional issues to be addressed (low exclusive breastfeeding rate; high prevalence of undernutrition amongst under-five children; increased prevalence of obesity and nutrition-related NCDs; micronutrient deficiencies), implementation mechanism (decentralisation, multi-sectoral approach), programme/activities identified and challenges in implementing NPANs. Several common challenges have been identified to be tackled by the countries for effective NPANs implementation, which include the need for greater coordination among relevant stakeholders, capacity for implementation, monitoring and evaluating system improvement, and significant financial commitment to the NPAN by the government. Several important similarities in the NPANs studied suggest that closer collaboration among countries and stakeholders on NPANs would be benefi-

cial. Opportunities should be created for periodic exchanges to enable sharing of experiences in the development and implementation of NPANs among the countries.

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Measuring Hydration in Daily Life

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Keyword: Hydration · Fluid intake · Drink

There is increasing evidence for links between both the volume and types of fluids (drinks and beverages), and the risk of chronic diseases. Accurate estimates of intake in populations are essential to explore these relationships. This will enable the identification of specific populations at risk of low fluid intake, in particular water intake, and allow exposure assessment of potential contaminates and specific nutrients present in fluids. However there are methodological difficulties when assessing fluid intake. Unlike other surveys the *Liq.In*[7] study uses a validated fluid intake diary to assess volume and types of fluids consumed over a 7 day period. The consistent use of this methodology facilitates intercountry comparisons and enables comparisons with national and international recommendations on fluid intake. To date 15 countries worldwide have been surveyed including China and Indonesia; longitudinal data is now available for both countries. More recently the Liq.In[7] study has reported data on patterns of consumption and locations of drinking events. These data provide useful information that is can be used when setting public health policies and developing programmes, aimed at reducing associated chronic diseases.

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Fluid Intake – A Scientific Approach

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Water has been described as a forgotten nutrient. Looking into the history of the dietary advices of USDA since 1947 water has not been included in the any of the nutritional advices including myPlate or different versions of the dietary pyramids. Interestingly even in nutrition conferences or scientific journals you rarely find any section related to water intake and health. Majority of what we know regarding water balance comes from dehydration, temperature regulation and exercise performance. Total body water that account approximately 60% of body weight is distributed inside (intracellular) and out of cells (extracellular). Extracellular water is the water between cells called interstitial water and the water contained as part of the blood known as plasma water. Osmoreceptors and baroreceptor in circulation are primarily responsible for body water regulation by activating thirst and the fluid regulating hormones. Increase in osmolality activates the hormone vasopressin (also known as anti-diuretic) that decreased urinary output. What is interested is that this hormone gets activated well before thirst is activated. People who consume low amount of water have

higher levels of vasopressin which has been associated with many negative health outcomes, like diabetes and chronic kidney diseases. On the other side adequate water intake decreases vasopressin.

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Advancing Physical Activities in China – Challenges, Opportunities and Programs Impact

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Keywords: Physical activities · Health · Health programs

Non-communicable diseases (NCDs) have become the major killer and burden in China, about 86% of total deaths caused by NCDs in 2012. As one of healthy lifestyle, physical activity has significant health benefits and contributes to prevent NCDs. Several studies in China showed that physical activity can reduce the incidence of diabetes, hypertension, major cardiovascular disease and cancer. However, only about 20% of adults (aged 20–69 years old) can reached the adequate amount of 150 min of moderate physical activity per week in 2014, and only 13.1% of children and adolescents (aged 9–17 years old) were physically active in 2016. National and local authorities have adopted actions or policies in a range of sectors to promote and facilitate physical activity. In 2004, "Happy 10 Minutes" was piloted to promote physical activity for primary schools in Beijing. After this, China CDC expanded the pilot nationally and it was widely recognized. This project also became one of the components in the *Action on Healthy Living for all Nationals* in 2011.Exercise is Medicine was one part of *National Exercise Plan* (2016–2020). A new Physical Activity Guidelines for Chinese will be jointly issued by National Health Committee and General Administration of Sport in 2019. Promotion of physical activity can contribute to Healthy China 2030.

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Heat Stress on Physical Activity – The Dos and Don'ts of Hydration

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Keywords: Hydration · Stress · Physical activity · Drink

Physical activities have shown to markedly improve human health and wellbeing. Environmental heat stress however often discourages or curtails outdoor activities through behavioural thermoregulation. This effect could potentially be made worse with global warming coupled with urbanization. In order to optimise exercise tolerance in the heat, various strategies are employed to alter heat strain such as maximising aerobic fitness, heat acclimatisation, pre-exercise cooling and fluid ingestion. Specific to fluid ingestion, the recommended volume to ingest before and af-

ter exercise is widely accepted. There are however differing views regarding fluid replacement during exercise. Severe under or over hydration has ill effects and therefore there is a need to drink correctly. Optimising the cooling effect from hydration solution by manipulating drink temperature and thermal capacity can enhance exercise tolerance especially in the heat. This presentation will cover key considerations in hydration to optimise physical activity levels.

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Dietary Protein in Support of Adaptation to Exercise: Finding the Signal in the Noise

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Keywords: Protein · Dietary protein · Athlete · Nutrition
Background/Aims: Athletes engage in vigorous training that places stress on physiological systems requiring nutritional support for optimal recovery. Of paramount importance when optimizing recovery nutrition are rehydration and refueling. However, in this presentation I will highlight the benefits for dietary protein intake over and above requirements set out in various countries at 0.8–1.0 g/kg body mass (BM)/d for training adaptation, manipulating body composition and hypertrophy in athletes. To facilitate the remodeling of protein-containing structures, which are turning over rapidly due to their training volumes, athletes with the goal of weight maintenance or weight gain should aim for protein intakes of 1.6 g/kg BM/d. Protein intakes at this level would not necessarily require an overemphasis on protein-containing foods, but there may be advantages to the consumption of higher quality proteins. I will also highlight that optimal protein intakes may need to exceed 1.6 g/kg BM/d for athletes who are restricting energy intake and attempting to minimize loss of lean tissue. I will discuss the underpinning rationale for weight loss in athletes, explaining changes in metabolic pathways that occur in response to energy restriction when manipulating protein intake and training. I will offer some practical advice on protein intakes that warrant consideration in allowing an optimal adaptive response for track and field athletes seeking to train effectively and to lose fat mass while energy restricted with minimal (or no) loss of lean BM.

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The Potentials of Rice in The Dietary Management of Diabetes

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Keywords: Rice · Diet · Food · Diet management
The World Health Organization (WHO) estimates that of the 8.5% diabetics globally, about half are in Asian regions (SEARO & WPRO). Asia's vulnerability to diabetes comes from multiple factors – lifestyle changes, urbanization, ageing, etc; in addition, growing evidence points to the contributions of phenotypic changes from an adverse uterine environment. As diet plays a key role in several of these factors, to what extent might rice be part of the equation – and is this towards the problem side or the solution side? About 90% of the world's rice is grown and consumed in Asia, with Asia prospering even as it is benefiting the most from the rice science that feeds the continent's billions. About a decade ago, however, studies emerged associating white rice intake with the increasing rates of diabetes, obesity and metabolic syndrome particularly among Asian populations. Because of the quantities of white rice that Asians consume, this was contributing significantly to the glycemic load of their diets, relative to other food sources, and was impacting especially on increased diabetes risk. Recent ecological data, however, points to a declining trend in rice intakes throughout most of Asia, alongside rising diabetes and obesity rates. More comprehensive studies from China, India, and Singapore provide a better understanding of the rice-diabetes relationship - of rice when part of a diet rather than as a single food item, inclusion of its quality and nutrient attributes, consideration of co-factors such as smoking, alcohol intake and physical activity – that emphasize lifestyle, rather than diet alone, as THE factor for pinpointing the problem and developing solutions. Interventions ranging from harnessing omics technologies in identifying niche-specific rice varieties, to behavior change that replaces white with brown rice, are proving to be effective as Asians continue to include rice as part of healthier food choices and a more diverse diet.

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A Low Glycemic Index Diet in The Management of Gestational Diabetes Mellitus: The Malaysian Experience

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Keywords: Glygemic index · Diet management · Diabetes milletus
Excessive postprandial hyperglycemia during pregnancy has been associated with substantial adverse health outcomes for women with gestational diabetes mellitus (GDM). Use of low glycemic index (GI) diet may be beneficial in the management of GDM. This randomized controlled study investigated the effects of low GI diet on glycemic-related parameters and dietary intake in women with GDM. A total of 40 participants managed with diet only were randomized to either low GI diet (Low GI; n = 20) or carbohydrate exchange (CE; n = 20) dietary plan. The 2 groups were similar at baseline. At 4 weeks, fructosamine decreased significantly from baseline in the both groups (p < 0.05). Low GI group had significantly better reduction in 1-hour post-breakfast glucose levels (6.7 ± 1.0 mmol/l) compared to the CCE group (7.6 ± 1.5 mmol/l). Similarly, low GI meal resulted in significantly lower capillary blood glucose levels at 30, 60, and 120 mins in comparison to high GI meal (p < 0.05). Low GI group had significantly higher dietary calcium (p < 0.05) and tended to have a higher dietary fiber intake (p = 0.05) than the CE group. Dietary GI in the LGI group was significantly lower by 7 units versus the CE group (p < 0.05). This study shows that Low GI and CE produced similar

improvement in overall glycemic control. Furthermore, those following a low GI diet may have additional benefits from lowering 1-hour post-breakfast blood glucose levels, increasing calcium and fiber intake. However, these results warrant further evaluation for longer duration during pregnancy.

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Nutrition Counseling and Plant Based Diet in the Management of Diabetes

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Keywords: Diabetes · Nutrition counseling · Plant based diet
The prevalence of type 2 diabetes is rising worldwide, especially in older adults. Diet and lifestyle, particularly plant-based diets, are effective tools for type 2 diabetes prevention and management. Plant-based eating patterns combined with exercise have been found to improve diabetes control and reduce the need for medication in intervention trials. Dietary choices are a key driver of insulin resistance, especially in an obese and more sedentary population. Increases in consumption of calorie-dense foods, including fast foods, meats & other animal fats, highly refined grains & sugar-sweetened beverages, are thought to play a critical role in the rising rates diabetes worldwide. Multiple potential mechanisms underlie the benefits of a plant-based diet as typical of traditional Indonesian eating habits in ameliorating insulin resistance, including promotion of a healthy body weight, increases in fiber and phytonutrients, food-microbiome interactions, and decreases in saturated fat, advanced glycation endproducts, nitrosamines, and heme iron. Result from our study in Jogjakarta shows that duration of the disease and type of occupation did not affect eating compliance in diabetic patients. Nevertheless, it was found that family support affected eating compliance (RP = 1,723 and p = 0.025) as well as eating schedule (RP = 2,151 and p = 0.02) among T2DM in Jogjakarta hospital. This finding suggest that a regular nutrition education are very important to increase macronutrients and micronutrient intake of diabetic patients.

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Relationship between the Gut Microbiome and Dementia: A Cross-Sectional Study Conducted in Japan

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Keywords: Gut microbiome · Dementia · Japan diet
Background/Aims: Dysregulation of the gut microbiome is associated with several life-threatening coditions and thus might represent a useful target for the prevention of dementia. However, the relationship between the gut microbial population and dementia has not yet been fully clarified. We recruited outpatients visiting our memory clinic to participate in this study. Information on patient demographics, risk factors, and activities of daily living was collected, and cognitive function was assessed using neuropsychological tests and brain magnetic resonance imaging scans. Faecal samples were obtained, and the gut microbiome was assessed by terminal restriction fragment length polymorphism (T-RFLP) analysis, one of the most well-established and reliable 16S ribosomal RNA-based methods for classifying gut microbiota. Patients were divided into two groups, demented and non-demented. Multivariable logistic regression models were used to identify the variables independently associated with dementia. We analysed 128 eligible patients (female: 59%, mean age: 74.2 years). The T-RFLP analysis revealed differences in the composition of the gut microbiome: the number of *Bacteroides* (enterotype I) was lower and the number of 'other' bacteria (enterotype III) was higher in demented than non-demented patients. Multivariable analyses showed that the populations of enterotype I and enterotype III bacteria were strongly associated with dementia, independent of the traditional dementia biomarkers. **Conclusions:** We have shown that components of the gut microbiome, in particular *Bacteroides* and 'other' bacteria, are independently associated with dementia. Further studies are needed to determine the mechanism underlying this association.

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Taiwanese Eating Approach (Tea) Associated with Cognitive Decline in Elderlies

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Keywords: Diet · Eating approach · Cognitive · Health
Dietary pattern or eating approach studies have been limited to a few types such as Mediterranean diet and DASH diet. Asian dietary patterns have not been widely studied and understood with the exception of Japanese diet. Using data collected from Nutrition and Health Survey in Taiwan, we carried out data mining endeavor and discovered that a plant-based diet featured with phytonutrient-rich foods (vegetables and fruits) and drinks (tea) and multiple types of non-red protein foods was inversely associated with mild cognitive impairment. Some of these features (tea and fish) were also shown to associate with lower risk of dementia development. This finding calls for more research in various ethnic and regional diets including the Asia-Pacific region in order to contribute to in-depth understanding, prevention, and management strategy of dementia.

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Nutrition and Cognitive Development in Children: Impact on Adulthood

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Keywords: Nutrition · Cognitive · Children · Adulthood

Animal models have demonstrated the importance of adequate nutrition for the neurodevelopmental processes that occur rapidly during pregnancy and infancy, such as neuron proliferation and myelination. However, several factors influence whether nutrient deficiencies during this period cause long-term cognitive deficits in human populations, including the child's interaction with the environment, the timing and degree of nutrient deficiency, and the possibility of recovery. Certain types of nutritional deficiency are clearly associated with long-term impairment in brain development, including severe acute malnutrition, chronic undernutrition, iron deficiency, and iodine deficiency. While strategies such as salt iodization and micronutrient powders have been shown to improve these conditions, direct evidence of their impact on brain development is scarce. Other strategies also require further research, including maternal and infant supplementation with iron and other micronutrients, essential fatty acids, and fortified food supplements during pregnancy and infancy.

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The Tummy Trial: Exploring the Role of DHA in the Development of the Infant Gut Microbiome

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Keywords: Omega-3 · Fatty acids · Breastmilk · Maternal supplementation · Microbiome

72 women who had delivered their infants vaginally at term, intending to exclusively breast feed for at least 12 weeks, were randomly assigned to take capsules containing either omega-3 LCP-UFA (providing 1000 mg of DHA and 300 mg of EPA/day) or a placebo from within 1 week of delivery until 12 weeks post-partum. Maternal blood and breast milk spots were collected for assessment of fatty acids status. Infant stool samples were collected for microbiota analysis. A total of 62 mother/infant pairs (86%) completed the trial. The omega-3 LCPUFA concentrations in both the blood and breast milk increased significantly between baseline and at the end of the 12-week intervention in the omega-3 group but decreased in the placebo group. Microbial richness and evenness increased across the 12-week period in both the omega-3 and control group. LEfSe analysis of all infant samples identified 6 taxa whose abundance was different between groups at 6 weeks of age, including an increased abundance of Bacteroidetes and Phascolarctobacterium in the omega-3 group, but no differences in taxa abundance at either baseline or 12 weeks of age. Our results provide no evidence to support the hypothesis that increasing the supply of omega-3 LCPUFA to term-born, vaginally-delivered breast-fed infants in the first 3 months after birth substantially impacts the development of the infant microbiome during this time. The increased abundance of bacteria from Bacteriodetes, a phylum with commensal bacteria, in the omega-3 group at 6 weeks may potentially signal improved maturation, but further studies are required.

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Associations of Maternal Dietary Intake and Blood Level of LC PUFAs in Pregnancy, and Newborn Body Composition

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Keywords: DHA · Maternal die · Newborn · Body composition · Pregnancy · Omega-3

Kombucha is a beverage made by fermenting sugared tea using a symbiotic culture of bacteria andyeasts. Kombucha consumption has been associated with some health effects such as: the reductionof cholesterol levels and blood pressure, reduction of cancer propagation, the improvement of liver,the immune system, and gastrointestinal functions. The beneficial effects of kombucha are attrib-uted to the presence of bioactive compounds that act synergistically. Bacteria contained in kom-bucha beverage belongs to the genus Acetobacter, Gluconobacter, and the yeasts of the genus Saccharomyces along with glucuronic acid, contribute to health protection. This review focuses onrecent findings regarding beneficial effects of kombucha and discusses its chemical compounds, aswell as the metabolites resulted by the fermentation process. Besides, some contraindications ofkombucha consumption are also reviewed. Bacteria contained in kom-bucha beverage belongs to the genus Acetobacter, Gluconobacter, and the yeasts of the genus-Saccharomyces along with glucuronic acid, contribute to health protection. This review focuses onrecent findings regarding beneficial effects of kombucha and discusses its chemical compounds, aswell as the metabolites resulted by the fermentation process. Besides, some contraindications ofkombucha consumption are also reviewed. Bacteria contained in kom-bucha beverage belongs to the genus Acetobacter, Gluconobacter, and the yeasts of the genus Saccharomyces along with glucuronic acid Bacteria

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Breastmilk DHA Testing: Applying Research Outcomes into Real-Life Solutions

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Keywords: Research grant · Personalised nutrition · Dried blood spot · DHA · Omega-3 index · Breast milk · Maternal supplementation

The health benefits of breastfeeding are widely acknowledged. Long chain polyunsaturated fatty acids (LC-PUFAs), notably eicosapentaenoic (EPA), docosahexaenoic (DHA) and arachidonic (AA) acids, in milk are important for infant (neuro) development. Although breast milk levels of ARA are fairly stable, breast milk levels of DHA are largely determined by maternal blood levels and influenced by intake, whether from fish and seafood intake or by DHA supplementation (e.g., dietary supplements, functional foods). DHA has important health benefits for pregnant and lactating mothers and increasing evidence shows that infants fed breast milk with a higher DHA content have better vision and neurodevelopmental outcomes. In the Tummy trial supported by the Asia research grant by BASF, PUFAcoatTM collection cards were used for collecting blood spot and breastmilk samples from both the placebo and intervention groups. The results showed the effects of DHA supplementation on maternal DHA status and breastmilk DHA content. These cards have now been developed into a tool that will enable mothers to measure their DHA status and breastmilk DHA content, giving mothers peace of mind and the opportunity to improve breastmilk DHA content. This development is one of the main objectives of the Nutrition Asia Research Grant by BASF. Established in 2012, the grant is a science-based platform to advance research in preventative health, to stimulate innovation and is an ideal platform for researchers to connect and exchange ideas to improve health of consumers in Asia-Pacific. The upcoming 2020 grant call for proposals will also be announced during the session.

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Inspired by Mothers Milk – Advancement in Infant Health Solutions with Human Milk Oligosaccharides

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Keywords: Human milk Oligosaccharide · 2'-fucosyllactose · Infant nutrition · Infant health

Human Milk Oligosaccharides (HMOs) are naturally occurring sugars available in human milk. They are the 3rd largest solid component in breast milk with approximately 200 unique structures identified varying from 3 to 22 sugars. Despite the role of milk to serve as a sole nutrient source for mammalian infants, HMOs are not digestible. They serve as prebiotics and reach the colon intact, where they selectively stimulate the growth of beneficial bacterial such as Bifidobacteria and Lactobacilli, inhibit pathogen infection, and promote crucial benefits related to immunity, allergy, digestion and brain and cognitive function—benefits that begin in infancy but have a lifelong impact on health. HMOs are the key differentiating factor between human and bovine milk. For the majority of mothers, 2'fucosyllactose (2'-FL) is the most abundant HMO in their breast milk. Human milk is the "gold standard" for infant nutrition, thus a lot of efforts are made to narrow the nutritional gap between human milk and infant formula, which are largely based on cow's milk. The availability of 2'-FL for use in infant formula is an important milestone contributing to this objective. Formula containing 2'FL can help shape babies' gut microbiota, strengthen their immune systems and reduce pathogen inhibition to be more like breastfed babies.

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The Socio-Cultural Drivers of The Protein Transition: New Trends In The Global Diet

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Keywords: Nutrition · Global diet · Protein transition · Urbanization

The term nutrition transition refers to dietary changes that occur in low and middle income countries (LMIC) in response to economic development. Traditional food patterns evolve in response to changes in food retail, more processed foods, and eating away from home. Consumption of traditional starchy staples declines with rising incomes, to be replaced by added sugars and by vegetable oils and fats. Based on studies of global dietary trends, the proportion of energy from sugars and fats is a function of both incomes and urbanization. By contrast, the proportion of protein in the diet remains virtually constant, regardless of incomes. Although plant-derived proteins tend to be replaced by animal proteins, the shift is not purely driven by economics. In South East Asia, the choice of animal proteins from among beef, pork, poultry, dairy or fish tends to be influenced by geography, ethnicity and religion and by the social and cultural historical context. Depending on location, plant proteins from staple grains can be replaced by meat (beef or pork), poultry or fish, or by milk and dairy products, including yogurt and cheese. Countries in SE Asia have shown rapid growth in meat consumption (poultry and fish) but not dairy; pork consumption in China has risen rapidly. Animal proteins in India come from rising milk consumption. Clearly, cultural and religious factors, in addition to incomes, are among the drivers of protein food choice. The newly identified "protein transition", viewed here as a subset of the nutrition transition, illustrates how the drivers of protein food choice are not purely economic but can also involve deeper societal, cultural, and ethical concerns. Such mixed-model studies point to the need of joining nutritional epidemiology methods with the social sciences in the study of evolving Asian food systems.

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Protein Transition: Bridging Theoretical Models to Enhance Connection of Scientific Nutrition and Public Policies

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Keywords: Public policies · Protein transition · Asian food barometer

Demographic transition, epidemiological transition, nutritional transition, energy transition the concept of transition has, for several decades, been a success that is growing in the scientific, political and media worlds. The protein transition corresponds to the switchover of plant proteins to animal proteins. Emphasized by theoreticians of the nutritional transition, it has long been thought of as a consequence of economic development (Drewnowski & Popkin, 1997). Because the choice of sources of protein is determined by socio-cultural factors, such as religious taboos relating to consumption of certain animals, promotion or not of vegetarianism or even more largely the symbolic hierarchies specific to each culture that organize the "order of the edible". This paper proposes to study the theoretical issues involved in the study of the protein transition on which biological, economic and ethno-cultural variables interact. It shows that, in public health, behind the expression "transition", there are two families of different theoretical models: on the one hand that of the demographic (Notestein,1944) and epidemiological transition (Omran,1971), and on the other hand that of the nutrition transition. The development of the protein transition is a privileged empirical field for establishing bridges between these two theoretical frameworks. The presentation is based on theoretical frameworks and methods used in the Asian Food Barometer for Malaysia and Indonesia. It is likely to allow the development of inter-science dialogue, both in terms of methodologies and analyses.

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Sources of Protein in Malaysia and Indonesia: A Comparative Analysis

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Keywords: Protein source · Nutrition software · Protein intake

Protein intake in the diet is essential for proper growth and functioning of the body. The objective of this study is to identify similarities and differences in the sources of protein in Malaysia and Indonesia. The sources of protein are evaluated based on the protein screeners using Food Frequency Questionnaire (FFQ) and 24-hour diet recall and analyzed using software Nutritionist Pro (Malaysia) and Nutri-Survey (Indonesia). Protein sources are categorized into animal protein (7 categories, fish, beef, pork, mutton, poultry, eggs and dairy) and plant protein (3 categories, cereals, legumes and tubers for Malaysia and other vegetables for Indonesia). The results showed that contribution of animal vs plant protein source to total protein were 54.4% vs 45.4% for Malaysians and 56.1% vs 43.9% for Indonesians. In Malaysia, animal protein sources which required killing contributed equally to the protein intake in both urban and rural. However plant protein contributed higher in the rural than the urban. In the urban, protein sources were mainly from poultry, pork, legumes and eggs while in the rural were fish and cereals. In Indonesia, animal protein intake was also higher in urban than rural area and influenced by region. Nonetheless, regardless of region, cereals contributed to the highest source of protein (27.4%±15.4%), followed by legumes (21.6%±22.3%). Legumes have high contribution to protein intake in East and West Java. As for animal protein, fish had very high contribution in West Sumatra and South Sulawesi while poultry in Bali. In conclusion, sources of protein intake were different between Malaysia and Indonesia. Animal to plant protein ratio intake in Malaysia was 6:4 while in Indonesia was 4:6. Considering animal protein is more complete in its amino acid contribution than plant protein, the population will be at higher risk of protein deficiency if plant protein is the major source of protein.

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Protein and Values System: Malaysia and Indonesia Comparative Analysis

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Keywords: Protein · Protein consumption · Jakarta

This paper aimed to explore the reasons for protein consumption in Indonesia and Malaysia through the subjects' understanding on proper meal and protein hierarchy. This is part of a "Socio Cultural Research in Protein Transition (SCRIPT) study", conducted using a qualitative method among adult male/female aged ≥19 years in Jakarta, Indonesia (December 2017-March 2018) and in Kuala Lumpur, Malaysia (March-April 2013) with three focus groups and 17 individual interviews in Indonesia and one focus group and 20 interviews in Malaysia. Variations in the subjects' gender, education level, age, ethnicity, religion, working status, marital status, and living arrangement were considered. Pre-tested guide questions using participatory approach (i.e. food ranking and pictures) were used to delineate the concepts under study. Thematic analysis was done to understand the experiences. The findings suggest that people's understanding on the concepts were very much contextual depending on the prevailing norms that were related to foods commonly available in the area and their habitual practices. The actual consumption on the other hand was linked to the economic dimension, practicality, and palatability of the foods. Our understanding on these insights may help promote more varied sources of protein (both animal and plant-based) that fulfill the availability-affordability-palatability concept.

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Proteins & Amino Acids Requirements: History of A Normative Definition

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Keywords: Protein · Amino acid · Protein transition

Amino acids are essential in the cellular synthesis in the human body. The protein transition shows a shift from a diet based mainly of plant protein to another one with more animal protein. The idea that, in the first stapes of protein transition in less developed countries or in vegetarianism, consumption of legumes and cereals must be done at the same meal for the complementation of their amino acids is broadly consensual in the community of "disseminators" of nutritional knowledge. Indeed, vegetarianism and veganism are promoted based on ethical, health, and ecological arguments. Further analysis of the scientific literature suggests that the unit of mealtime is not based on scientific evidence. Indeed, some articles explicitly question the need for consumption at the same food intake and open the perspective of a wider time scale. One of the debates seems to be the time frame of protein metabolism. More specifically, the diversity of the time frames of the processes associated with the creation of a pool of free essential amino acids: (1) Digestion in the upper and lower digestive tract and (2) turnover of muscle tissue proteins (FAO, 2013). Based on the research project "Socio-Cultural and economic Research in Protein Transition in South-East Asia: Focus on Malaysia and Indonesia (SCRiPT)", this paper will analyse the scientific controversies surrounding the definition of the amino acids requirements and their popularisation. It unveils some interweaving of science and society.

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Past Experiences and Future Prospects of Nutrition Higher Education Collaboration in Asia: Case of Department of Community Nutrition, IPB University

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Keywords: Higher Education · Collaboration · Asia

Higher education in Indonesia are currently facing global challenges in becomming world-class university. One of the strategies to overcome them is through internationalization of the academic aspect as well as non-academic aspect. Internationalization in higher education may have an impact on the quality of education, human resources, and alumni. The Department of Community Nutrition in FEMA IPB is the pioneer in Nutrition Study Program in Indonesia. Over the years the Department has established collaborations and network with several universities in Asia, Europe, and North America. These collaborations includes exchange of students and lecturers, research, student field work, and visiting professors. Intensive collaboration programs was done with three University, namely Chulalongkorn University, Universiti Kebangsaan Malaysia (UKM), and the University of Niigata Prefecture. In 2014 to 2017, the collaboration with Chulalongkorn University started with student's exchange program. Every year students from Thailand would come to Indonesia to receive a short course around 1 week. This would apply vice versa, where students from Indonesia would come to Thailand to be enrolled in a 1-semester scholarship funded by the university. With the University of Niigata Prefecture, the collaboration started in 2017 until now, which included Summer Course Program and exchange of lecturers. While with UKM the program started from 2016 until now, especially in student fieldwork from UKM. This year and in the following year the Department of Community Nutrition IPB plan to conduct a Summer Course Program and will invite students from some partner universities with free of charge of accommodations, meal, and local transportation. Moreover, next year the Department will also

start to conduct an international Seminar for students and lecturers and will collaborate with other universit to host the program alternately every year.

Past Experiences and Future Prospects of Nutrition Higher Education Collaboration in Asia: A case of Department of Nutrition and Dietetics, Chulalongkorn University

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Keyword: Higher Education · Nutrition · Collaboration · Asia
Globalization is one of the factors impacting on food consumption and eating behavior leading to unhealthy patterns of nutrition and high risk of NCD development. Today Asian region is experiencing significant changes in social structures and also disappearing of local culture and food tradition. Nutrition Higher education (HE) in Asia playing an important role on producing nutritionists, dietitians, and also researchers having high ability to harmonize the globalization and nutrition self-awareness through nutrition education and behavior modification. Therefore HE should take benefits from the positive impacts of Asianization in aspects of the knowledge related to tradition food, culture, and lifestyle, and also innovation to strengthen the knowledge in Asian region and simultaneously resist the negative impact of globalization on nutrition problems. The Department of Nutrition and Dietetics, Chulalongkorn Universitye stablished in 2011 with the primary aim on providing professional international quality Dietitian-Nutritionists to Thai society. Since 2013, the department have established collaborations and networks with many universities in Asia through the student exchange program and research networks supported by university funding. There were thrity-two of undergraduate students having a chance to exchange knowledge and culture through the student exchange program in three universities, including Department of Community Nutrition at Bogor Agricultural University (IPB), School of Biological Sciences at University of Hong Kong, and College of Medicine and Department of Nutrition at Chung Shan Medical University in Taiwan. For the inbound exchange student, thirteen undergraduate students from University of Health Sciences in Lao P.D.R. and eighteen graduate student and two undergraduate students from IPB earning the CU scholarship for ASEAN countries enrolled in a 1-semester class. This inbound and outbound student exchange program with IPB will keep on in the future. Moreover, the Department has connection with the Clinical Nutrition Research Centre, NUS for research network and research student exchange. Also students and faculties in the department exchanged knowledge with invited speakers from many countries in Asia and USA. In the future the Department will extend the scopes of collaborations to exchange of lecturers and visiting professors and international workshop arrangement linking to research networks in the long run.

Past Experiences and Future Prospects on Nutrition Higher Education Collaboration in Asia: A Malaysian Perspective from a Public University

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Keywords: Nutrition Higher · Education · Nutrition program
The Nutritional Sciences programme in UKM is the pioneer Nutrition programme in Malaysia. It was first set up in 1973 as part of the Department of Food Science and Nutrition, Faculty of Life Sciences in the main campus, Bangi. In 1995, the Department of Nutrition and Dietetics was established under the Faculty of Allied Health Sciences in the branch campus, Kuala Lumpur. In 2011, with the restructuring of the Faculty, Nutritional Sciences Programme was separated from Dietetics. Since the establishment, the Nutrition programme has offered courses in BSc Nutrition Science, Masters of Nutrition by coursework and research as well as Doctor of Philosophy in Nutrition. Over the years UKM has established collaborations and networking in both teaching and learning, research and consultation with several national universities (UPM, USM, UiTM, Taylors University IMU) in Malaysia and international universities (Nottingham University, University of Glasgow, Kagawa Education Institute of Nutrition, Japan, Avinashilingam University India and Agriculture Institute Bogor, Indonesia, These collaborations included exchange of students and lecturers, sabbatical attachments for lecturers, student internship and visiting professorship. Collaborations and networking continue with partnership with food industries (Nestle, Dutch Lady, Danone Dumex, Yakult) professional bodies (MASO, NSM, MDA) and ministries such as MOH, MOE, Ministry of Sports. UKM strives to continue with these collaborations and establish new ones in particular with Asian counterparts in all aspects of teaching and learning, research and consultation.

Past Experiences and Future Prospects of Nutrition Higher Education Collaboration in Asia: Case of the Institute of Human Nutrition and Food, University of the Philippines Los Baños

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Keywords: Human nutrition · Food · Nutrition
The Institute of Human Nutrition and Food (IHNF) College of Human Ecology, University of the Philippines Los Baños has the biggest number of undergraduate and graduate students in human nutrition in the Philippines. It offers one undergraduate (BS Nutrition) and 3 graduate degree programs including PhD in Human Nutrition; Master of Science in Applied Nutrition and Master of Professional Studies on Food and Nutrition Planning (MPS-FNP). Based on its new charter, UPLB as the Philippines' national uni-

versity is committed to become a graduate and research university and this requires collaborative efforts with local and international academic institutions. To realize this, one of the actions of the institute is to create a committee on internationalisation to plan and implement programs to improve IHNF's visibility in collaborative efforts with different academic institutions in Asia and beyond. In the past, IHNF has a long history of international collaboration through the MPS-FNP program wherein selected scholars from different parts of Asia studied food and nutrition planning in UPLB. At present, while IHNF adapts the latest and revised BS Nutrition curriculum, it is also revisiting its MS in Applied Nutrition and the PhD in Human Nutrition programs to make it more responsive to the needs of the nutrition community locally and abroad. Aside from mentoring international students from Asia and Africa in the MS and PhD programs, IHNF also hosts undergraduate exchange students from USA. In addition, IHNF regularly serves as host of practical experiences of undergraduate Japanese students particularly on Filipino food culture. While IHNF still needs to improve its effort to collaborate internationally, the institute is highly committed to learn the process and be a worthy collaborator for the benefit of nutrition learners in the country and abroad.

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Collaboration In Nutrition Education Between Japan and other Asian Countries: A Case Study of A Japanese University

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Keywords: Nutrition · Higher education · Collaboration · Asia · Double burden of malnutrition

The past experiences and future prospects of collaboration in nutrition education in Asia are presented through a case study of a Japanese university. In 2015, academic and education exchange agreements were concluded between the University of Niigata Prefecture (UNP) and Bogor Agricultural University (IPB) in Indonesia. A collaborative research project on school meal programs in Indonesia was started in 2016, followed by a joint summer course (held at both UNP and IPB) for students in 2017. In addition, faculty members from IPB visited Japan to discuss the next steps of the collaboration in 2017. UNP and IPB agreed to expand collaboration based on the summer course and a short-term faculty training program. The summer course was revamped in 2018. Together with Indonesia and Malaysian students, Japanese students took part in a summer course at IPB and visited many local sites related to nutrition and community development, such as a Japanese food company in Indonesia, NGOs, and organizations that run community nutrition programs. Young Japanese faculty members also participated in this program and provided broader perspectives for this course. In 2019, we will host an international symposium and short-term training program for faculty members from IPB and other universities. They will be able to observe nutrition programs in the community and at preschools and elder care facilities. We next hope to expand these sorts of collaborations, student programs, and faculty ex-

changes to other Asian countries in order to foster the ability of students and faculty members to solve global nutrition problems such as the double burden of malnutrition.

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Introduction to the Linear Programming for Optimal Diet and the Session's Topic

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Keywords: Food-based recommendation · Linear programming · Nutrient gap · Optifood · Problem nutrients

Affordable, available, and locally contextual food based recommendations (FBRs) that take into account cultural diversity and food availability is expected to result in long-term improvements in complementary feeding practices than general recommendations. Linear programing (LP) is an optimization method that can be used to identify optimal but realistic, available, and affordable food based recommendations to meet Recommended Nutrient Intakes (RNIs) of energy and nutrients. Using LP diet which come closest to RNIs can be identified while simultaneously take into account food availability, food patterns, food portions, and cost. "Optifood" is a software developed by WHO which uses LP to identify specific problem nutrients, identify nutrient-dense foods or food subgroups and compare alternative sets of FBRs/CFRs. Using LP the general food based dietary guideline in a country can be further translated into population specific FBRs to address specific problem nutrients in a given population given the food availability and food pattern. LP can be used to identify nutrient gap in order to design specific fortified products (nutrition specific intervention) and to guide specific nutrient-dense foods which should be planted such as in school and home gardening program (nutrition sensitive intervention). More recently LP has been used to optimize diet to ensure adequacy of diet not only for minerals and vitamins but also for fatty acids, expanding its potential use in developing optimal diet for non-communicable disease prevention.

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Effect of Optimized Food-Based Recommendation, Biscuits Fortified with Essential Fatty Acids and Micronutrients on Cognitive Performance of Myanmar School Children

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Keywords: Cognitive performance · Essential fatty acids · Fortified biscuits · Linier programming · Primary school children · Optimized food-based recommendation

Several studies have assessed effect of micronutrients on cognitive performance of school children. However, no study has assessed combined effect of micronutrients and essential fatty acids (EFAs) based on actual nutrient gap. This study aimed to determine effect of optimized food-based recommendation (FBR) and fortified biscuits (FB) developed using linear programming (LP) on cognitive performance of primary school children. In Phase-1, LP was used to develop optimized-FBR and identify nutrient gap (RNI-%RNI from optimized-FBR) to formulate the fortified biscuit. In Phase-2, a six-month cluster randomized controlled trial among 7–9 year-old school children (n = 252) was conducted in 12 schools in Nyaungdon Township, Myanmar with three intervention groups: optimized FBR with fortified biscuits (FBR+FB), optimized FBR (FBR), and control. Cognitive performance (using Wechsler intelligence scale), anthropometry and biochemical indicators (hemoglobin, serum ferritin, serum transferrin receptor, body iron storage, plasma alpha linolenic acid level) were assessed. Both FBR and FBR+FB had significant effect on cognitive performances (attention, memory, speed of information processing), weight-for-age Z-scores, serum ferritin, serum transferrin receptor and body iron storage but plasma alpha-linolenic acid level increased significantly only in FBR+FB. FBR+FB improved cognitive performances better than FBR on attention, memory, speed of information processing and executive functioning. Optimized FBR alone was not sufficient to meet adequacy of EFAs for these school children and its combination with fortified biscuits results in better outcome on cognitive performance. This finding support policy maker for further school-based nutrition promotion programs in Myanmar.

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Use of Linear Programming in Improving the School Feeding Program and School Gardening for Primary School Age Children in the Philippines

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Keywords: Linear programming · School-and-home garden project · School-based feeding program

Background/Aims: The Philippines' Department of Education is currently implementing school-based feeding and the school plus home vegetable garden programs in schools. The linear programming (LP) approach is currently being used to identify the nutrient gap among school children in order to improve the nutrient density of food served in the feeding program and to make the school and home gardening program more nutrition sensitive. **Methods:** Seven-day dietary assessment using 24-hour food recall, food weighing and food record among 100 school children whose ages are 6–9-year-old was conducted. Food environment survey for school children was also conducted in the municipality where the project is being piloted based on the food sources identified in the dietary assessment. Optifood software was used in identifying specific problem nutrients and nutrient-dense foods or food subgroups and in comparing alternative sets of food-based recommendation (FBR). **Results:** LP was used to develop optimized FBR and identify nutrient gap to improve the 120-day school menu of the food-based feeding program. Specific indigenous and local crops were also identified to be planted in the school and home gardens and other nutrition-specific interventions were also specified to address the problem nutrients among school children. **Conclusions:** The optimized FBR for 6–9-year-old school children can improve the nutrient content of food served in the school-based feeding program and can help to identify which plants should be planted in the school and home gardening program.

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Partnership to Translate Guidelines into Practices for Optimal Diet of Southeast Asian Community

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Keywords: Capacity building · Food-based recommendation · Linear programming · Optifood · Partnership

South East Asian (SEA) region still faces great challenges in combating malnutrition especially amongst children and women of reproductive age. These problems have been attributed to inadequate nutrient intake from diet. In contrast locally available nutrient-dense foods or food subgroups are available which have potential to improve nutrient adequacy from diet and therefore need to be identified and promoted as population-specific food based recommendations (FBRs) for these vulnerable group. In order to succeed this effort will require collaboration with those engaged in dietary data collection (such as academia or research institutions),

program implementers, policy makers and other relevant stake-holders. Under "Model of partnership to translate guidelines into practices for optimal diet of Southeast Asian community" SEAMEO RECFON provides capacity building and technical advise for academe and program implementers on dietary data collection and Optifood to formulate population-specific FBRs, to implement FBRs, to evaluate the effectiveness of FBRs in improving nutrient intake and nutritional status of target groups and to disseminate the findings. Since 2015, capacity building on LP analysis using Optifood has been delivered for five countries (Cambodia, Indonesia, Lao, Myanmar, and The Philippines) and reached 181 personnel in 74 institutions in those countries. School-based and community-based models promoting population-specific FBRs have been developed for various target groups including under-two children, school-aged children, adolescent girls, and women of reproductive age, pregnant and lactating mothers. The partners include Ministry of Health, Ministry of Education, local government, academic institutions, professional organizations and international NGO

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New Innovation on Vegan Food

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Keywords: Vegan · Food · Innovation

Veganism began around 7000 BCE, about 9000 years ago. In 500 BCE, Pythagoras, the Greek Philosopher was against the consumption of animal meat. Donald Watson in 1944 introduced the term "Vegan" which consisted the first 3 letters and last 2 letters of Vegetarian. Vegan (total vegetarian) abstains from taking eggs, honey, as well as dairy products and by-products. About 2000 years ago Tofu was invented during the Han Dynasty while imitation meat was mentioned in the Ancient Classic Novels of the Song (13th Century) and Ming (16th Century) Dynasties. Meanwhile in Indonesia Tempe was invented in Central and East Java around 12th to 13th Century. In 1980s, the vegetarian mock meat was labeled as unhealthy due to the additives of artificial flavour, artificial colour, and other preservatives. Since 2011, people became more health conscious. Emphasis of vegan substituted products are on improving the texture, quality and natural flavours & colouring. Today, most vegan products are made of natural ingredients eg: nuts or grains milk to substitute animal milk. Soy and mushroom for vegan meat. Beetroot juice for red color on food. Dry tempe powder for easy storage and consumption during travelling. How New Innovation of Vegan Food benefits us? Fortified food to enhance the daily intake of nutrition that are lacking from natural resources nowadays especially vitamin B12 due to environmental pollution since the 1800 industrial revolution. High quality vegan products are now more receptive to non vegans.

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The Nutritional Status of Vegetarian Children Under Five in Jakarta 2008

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Keywords: Vegetarian · Children · Nutritional status

There are few studies on the nutritional status of preschool vegetarian children under five, but there is no official study on the status of preschool vegetarian children in Indonesia. The objective of this study is to understand the factors related to nutritional status of vegetarian and nonvegetarian children under five in Jakarta. Cross-sectional design is used in this study.. Samples collected by *purposive sampling* from the vegetarian and nonvegetarian children under five in Jakarta. 148 samples collected (75 vegetarian and 73 nonvegetarian). Data collected include weight, length/height, mother and child characterization, child caring and health. Dietary intake using food recall 1x24 hours and BMI-for-Age (BAZ) is used for nutritional status. Univariate, bivariate and multivariate data are analyzed by using SPSS. 5.3% of vegetarian and 12.3% of nonvegetarian children under five are obese, 13.3% of vegetarian and 8.2% of nonvegetarian are overweight, 25.3% of vegetarian and 21.9% of nonvegetarian are at risk of overweight, 56% of vegetarian and 57.5% of nonvegetarian are normal 4% of vegetarian and 2.7% of nonvegetarian children are stunted. There is no significant relationship between diet pattern (vegetarian, nonvegetarian) and nutritional status (BAZ). There is no significant difference in nutritional status (BAZ) between vegetarian and nonvegetarian children under five.

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Mycoprotein: A Solution for Healthier & More Sustainable Planet

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Keywords: Mycoprotein · Vegan food · Food innovation

Global meat consumption is projected to double between 2000 and 2050, driven by both population and income growth. Our trajectory as humankind of meat consumption is unsustainable, as shown evidently by global environmental markers. The approach of livestock intensification to address the increasing demand for meat appear to be at the limit. Global health markers also show that our humankind diet pattern and lifestyle lead to an unsustainable outcome. The top causes of death today are dominated by affluence diseases. Processed meat and red meat have been attributed to cause cancer. Budget of governments are increasingly strained to provide health care. In this presentation, we consider these environmental and health challenges and introduce a novel protein named Mycoprotein, which is derived from fungus species *fusarium venenatum*. This microfungus species was discovered 50 years ago for the purpose of discovering an alternative protein to address

global food security, which is exactly the same concern we have today. We will discuss mycoprotein unique production approach as well as its nutrition profile and potentials in the area of disease prevention (cholesterol, obesity, diabetes), sports performance and healthy aging.

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Associations among Dietary Seaweed Intake, *C-MYC* Rs6983267 Polymorphism, and Risk of Colorectal Cancer in A Korean Population: A Case-Control Study

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Keywords: Seaweed · *c-MYC* rs6983267 · Genetic polymorphism · Colorectal cancer

The effects of seaweed compounds have been studied in relation to colorectal cancer (CRC) based on their ability to modulate carcinogen metabolism *in vivo* and *in vitro*. However, no epidemiological studies on the interaction between edible seaweed and genetic variants relevant to CRC have been reported. This study examined the associations among dietary seaweed intake (gim, miyeok, and dashima), single-nucleotide polymorphisms (SNPs; rs6983267, rs7014346, and rs719725), and CRC risk in a Korean population. The participants comprised 923 CRC patients and 1,846 controls who visited the National Cancer Center Korea. We used a semiquantitative food frequency questionnaire (SQFFQ) and genotyped SNPs using genomic DNA samples. The intake of total seaweed, miyeok, and dashima showed a significant inverse association with CRC risk after adjusting for potential confounding factors (total seaweed odds ratio (OR) [95% CI] = 0.65 [0.50–0.85], *P* for trend <0.001; miyeok = 0.82 [0.62–1.09], *P* for trend <0.05; dashima = 0.58 [0.44–0.76], *P* for trend <0.001, highest vs. lowest tertile). We confirmed that the homozygous T/T allele of rs6983267 *c-MYC* indicated an interaction between dietary seaweed intake and both overall CRC and rectal cancer (CRC OR [95% CI] = 0.52 [0.34–0.81], *P* for interaction = 0.015; rectal cancer = 0.45 [0.25–0.79], *P* for interaction = 0.007, T/T carriers with high total seaweed intake vs. T/T carriers with low total seaweed intake). This study provides evidence of the effect of dietary seaweed intake on CRC risk with respect to *c-MYC* gene variants.

Track 1: Dietetics and Clinical Nutrition

Oral Presentation

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Comparison of Different Early Enteral Feeding Formulas on Critically Ill Patients

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Keywords: Critical ill · Early enteral feeding

Background/Aims: Critically ill patients are physiologically unstable, often have complex hypermetabolic responses to trauma. These patients are facing a high risk of death, multi-organ failure, and prolonged ventilator use. Nutrition is one of therapy for critical illness, however, patients often experience malnutrition caused by disease severity, delays in feeding, and miscalculation of calorie needs. The aim of this study was to evaluate clinical improvement in critically ill patients that were given three kinds of early enteral feeding formulas, which were control (5% Dextrose), high protein polymeric (Peptisol), or oligomeric (Peptamen) formulas. **Methods:** A total of 55 critically ill patients admitted to intensive care unit (ICU) between October 2017 – March 2018 and assigned in this controlled trial. Early enteral feeding was initiated within 24–48 hours after ICU admission. Each enteral feeding groups were categorized to traumatic brain injury (TBI) or non-TBI. The primary endpoints were changes in white blood cell count, Acute Physiologic and Chronic Health Evaluation (APACHE) II score, and Nutrition Risk in the Critically Ill (NUTRIC) score from baseline to-day 3. **Results:** Baseline characteristics were similar between control (n = 22), high protein polymeric (n = 19) and oligomeric (n = 14) feedings in both groups. There were significant differences for white blood cell count (13262.5 ± 6963.51 to 11687.5 ± 7420.92; p = 0.041), APACHE II score (17.33 ± 3.31 to 13.83 ± 1.95; p = 0.007), and NUTRIC scores changes (3.08 ± 1.44 to 1.92 ± 1.00; p = 0.022) in non-TBI patients receiving Peptisol compared to 5% Dextrose or Peptamen. But there is no significant clinical improvement in TBI patients. **Conclusion:** Non-TBI patients benefit from high protein early enteral feeding.

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Antidyslipidemic Activity of Coffee (*Coffea liberica* Var. *Dewevrei*) and Black Seed Oil (Nigella sativa) in High Fat Diet Rat Model

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Keywords: Antidyslipidemic · Black seed oil · Coffee · High fat diet

Background/Aims: High fat intake may be at risk for dyslipidemia. The objective of this study was to investigate the antidyslipidemic activity of coffee, which contains caffeine, cafestol, and kahweol; and black seed oil, which rich in antioxidant and thymoquinone; in lipid profiles improvement of rats fed high fat diet (HFD). **Methods:** Quail egg yolk (3 ml) were administered by oral gavage for 14 days. HFD-fed rats were administrated with 4 different treatments: simvastatin as an standard treatment (P1), 0.18 g coffee dissolved in 3.6 ml water (P2), 0.27 ml black seed oil (P3), and 0.18 g coffee mixed with 0.27 ml black seed oil (P4). The treatments were compared to the control group which received water (K). At the end of 21 days of treatments, level of total cholesterol (TC), low density level (LDL), and high density level (HDL) were analyzed by CHOD-PAP, while triglyceride (TG) was measured by GPO-PAP method. **Results:** All of treatment groups occurred lipid profiles improvement ($p < 0.05$). The best result showed by P3 which successfully by significantly decreased TC, LDL, and TG by 85.74 ± 3.34 mg/dL ($p < 0.05$); 40.11 ± 3.35 mg/dL ($p < 0.05$); and 40.11 ± 3.35 mg/dL ($p < 0.05$) respectively; and increased HDL by 19.66 ± 3.45 mg/dL ($p < 0.05$). **Conclusion:** Compared to the other treatments, 0.27 ml black seed oil gives the desirable improvement of the lipid profiles of HFD-fed rats.

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Impact of the Novel Biochemical Parameter – Calcium Score in Preventing the Progression of Cardiovascular Diseases to Invasive Interventional Techniques

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Keywords: Cardiovascular diseases · Calcium score · Novel biochemical parameter

Background/Aims: The existing risk assessment techniques used have serious limitations and do not give clear evaluation of the cardiovascular diseases. The objectives of this study is to investigate the impact of calcium score level – the novel biochemical parameter, in preventing the progression of the cardiovascular patients to PTCA (Percutaneous transluminal coronary angioplasty) and CABG (Coronary Artery Bypass Grafting). **Methods:** The study was conducted in Visakhapatnam district Andhrapradesh. A sample size of 400 cardiovascular patients, selected for the study were screened for their biochemical parameters and the subjects were grouped into sub samples of 3 each with 50 subjects namely primordial group (on diet and medicine), secondary group (advised PTCA), and post PTCA (advised CABG. Intervention was given for 6 months and the results were consolidated with reference to biochemical parameters. Statistical analyses were done and comparative results were interpreted. **Results:** The results concluded that calcium score the novel biochemical parameter as a key preventive measure among the usual biochemical management conducted by the clinicians to diagnosis and confirm the severeness of the disease and to correct the scenario suffering the ill effects of the cardiovascular diseases at the primitive stage of the disease. **Conclusion:** Calcium score prevents the progression of cardiovascular disease.

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Hypocholesterolemic Effect of Curcuma Amada Roxb

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Keywords: Hypercholesterolemia · Hypocholesterolemic effect · Supplementation · Mango ginger

Background/Aims: Hypercholesterolemia is a major risk factor for cardiovascular diseases. Curcuma amada Roxb. is a rhizomatic herb commonly known as Mango ginger has a beneficial effect on the lipid profile of mild hyper cholesterolemic adult patients. Hence the present study carried out with the objective of to find out the hypocholesterolemic effect and the possible compounds in Curcuma amada Roxb. in bringing about the hypocholesterolemic effect. **Methods:** An interview method was adopted to collect data from selected subject using. All the subjects were screened for total cholesterol. Forty mild hyper cholesterolemic adult women were selected for supplementation study. Experimental group of twenty subjects were supplemented with Curcuma amada Roxb. The lipid profile of the selected subjects was estimated before and after supplementation. Possible compounds were identified by FTIR analysis. Thirty six per cent were identified as overweight. **Results:** It was found that total cholesterol increases with increasing Body Mass Index. The lipid profile level of the experimental group had decreased and HDL level gets improved after supplementation of curcuma amada Roxb. There are ethers, alcohols, amides, alkanes bringing about the hypocholesterolemic effect. Curcuma amada Roxb has a beneficial effect on the lipid profile of mild hyper cholesterolemic adult patients. It is due to the compounds present in it. **Conclusion:** Curcuma amada Roxb has a hypocholesterolemic effect.

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Nutritional Challenges in Pediatric Congenital Cardiac Care

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Keywords: Congenital heart disease · Nutrition · Feeding protocol · Cardiac

Background/Aims: Malnutrition significantly contributes to morbidity in children with congenital heart disease (CHD), which is influenced by type of cardiac lesion, malabsorption, hypermetabolism and poor nutrient intake. Most of the congenital heart defects are present at birth but diagnosed and treated late due to poor resource availability in developing countries. Children with CHD may experience poor weight gain and linear growth due to several factors like increased work of breathing, increased energy demand, at the same time decreased overall calorie intake. **Methods:** This is a review of the literature on nutritional challenges and benefits in pedeatric congenital care. **Results:** Children with CHD need caloric supplementation before and after surgical/medical management of their cardiac condition to achieve catch up growth. So with improved supplementation of calorie, protein and side by side treating their heart failure medically and correcting their pathology surgically would be the holistic approach to deal with the situation. There are lacunae of randomised controlled trials to specify the nutritional need and feeding protocol about how to initiate and advance enteral feeding among these infants, so it is important to understand the challenges to fulfil their nutritional requirements. The results of this review showed that improved strategies for nutritional support and standard feeding regimen have been associated with increased survival and decreased overall morbidity. Preoperative optimization of nutritional status and early initiation of postoperative nutritional supplementation enterally may improve the clinical outcome. **Conclusion:** Nutritional support associated with decreased morbidity and increased survival

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Effects of High and Low Sugar Diets on Cardiovascular Disease Risk Factors

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Keywords: Sugar · Cardiovascular disease · Risk factors

Background/Aims: It has been proposed that a high sugar intake was associated with cardiovascular disease (CVD) risk and metabolic syndrome depending on the amount of carbohydrate (CHO), other nutrients in foods, and underlying metabolic disturbances. Previous clinical studies concluded that high fructose intake increased plasma triglyceride (TG) and decreased plasma HDL, however, long-term impact of the quality of CHO, in real foods among free-living people is unknown. This study aimed to investigate the effects of high sugar (HS) and low sugar (LS) diets on metabolic profiles in 25 middle-aged men in a 12-week randomised cross-over intervention study. **Methods:** An isocaloric dietary exchanged model consisted of HS (24% energy from sugar) and LS (6% energy from sugar) with comparable total CHO, fat and fibre composition in normal foods was used. Anthropometric, blood pressure and plasma lipid profile were measured pre- and post-intervention. **Results:** Body weight, waist circumference and fat mass increased and decreased significantly after HS and LS ($p < 0.05$), respectively. Plasma TG increased significantly after HS and decreased after LS. Plasma HDL decreased and increased after HS and LS, respectively, whilst, plasma TC and LDL decreased significantly after LS. There was no significant change in other parameters after either diet. This study confirmed that a diet with a greater proportion of sugar increased CVD risk via negative changes in metabolic profiles including body weight, waist circumference and lipid parameters, whereas LS produced the positive effects. **Conclusion:** A restriction of sugar intake to lower than 10% energy intake is vital to reduce CVD risk.

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Relationship Between Oral and Body Muscle Strength, Food Preferences and Daily Living Habits in Nursery School Children

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Keywords: Nursery school child · Body muscle strength · Tongue pressure · School lunch

Background/Aims: Good eating and exercise habits need to be instilled from early childhood. In this study, we examined the relationship between body and oral muscle strength, food preferences and daily living habits in young children. **Methods:** The subjects were 26 nursery school children (3–5 years old) for whom consent for participating in the study was obtained. In these subjects, (1) motor function, (2) body composition, (3) body muscle strength, and (4) oral muscle strength were measured, and (5) food preferences/daily living habits and (6) amount consumed in school lunches were surveyed. **Results:** Children with good motor function (Good group) were taller and weighed more than the other children (Poor group). Lean body mass tended to be greater in the Good group than in the Poor group. Oral diadochokinesis and tongue pressure were higher in the Good group than in the Poor group. Bedtimes were significantly earlier and meal times significantly longer in the Good group. The amount consumed in school lunches was significantly larger in the Good group than in the Poor group. **Conclusions:** These results indicate that nursery school children with stronger oral and body muscle strength and a better trunk balance (motor function) tend to sleep better (bedtime) and eat better (meal times, amount consumed in school lunches).

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Relationship Between Swallowing of Food with Citric Acid and Activity Intensity after Training

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Keywords: Female athlete · Exercise strength · After the training · Citric acid

Background/Aims: The athlete uses energy after exercise. The energy supply is effective recovering fatigue texture, inparticular the citric acid intake is validated by relieving fatigue. However it is not clear what kind of texture is easy to take in citric acid after exercise. The purpose of this study is to investigate a relationship between swallowing of the food with citric acid and activity intensity after the training. **Methods:** The subjects of this study were 21 women's basketball players. The food with citric acid were divided into four items, normal rate of gelatin, 0.5 times, twice and no gelatin. This study surveyed their eating habits and exercise habits using a questionnaire, and FFQG. The activity intensity measured by an accelerometer and the rate of perceived exertion. "Thick of taste" and "Ease of swallowing" measured using Visual Analog Scale. The relation between the activity intensity and "Thick of taste" and "Ease of swallowing" was investigated by Spearman's correlation coefficient test. **Results:** There is a positive coefficient correlationship between thickness of taste and texture. There is a negative correlation was seen in twice texture between activity intensity and easiness of swallowing. **Conclusion:** The activity intensity had an influence on the easiness of swallowing of the food with citric acid.

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Nutritional Therapy for A High Output Enterocutaneous Fistula Patient: Case Report

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Keywords: High output enterocutaneous fistula (ECF) · Hypoalbuminemia · Parenteral nutrition

Background/Aims: Nutritional therapy goals for enterocutaneous fistula (ECF) patient are providing adequate nutrient requirements, maintaining fluid and electrolyte balance, and enhancing spontaneous ECF closure. **Methods:** An 18-year-old moderate malnourished female patient was diagnosed with post-laparotomy high output ECF. She complained decrease of oral intake due to lack of appetite for 1.5 months accompanied by several fistulas at the abdomen region after the third laparotomy. On physical examination, the greenish liquid was seen on fistulas' dressing. Nutritional assessment was based on Subjective Global Assessment. Abnormal laboratory values were hypoalbuminemia (2.8 g/dl) and hyperbilirubinemia (total bilirubin 3.07 mg/dl, direct bilirubin 2.30 mg/dl). Nutritional therapy was given gradually with target energy 2200 kcal and protein 2 g/kg IBW/day (117 g) through oral and parenteral. Fluid and electrolyte replacement were given while monitored through daily fluid balance and laboratory result. Multivitamin and glutamine supplementation were administered through oral and parenteral. Laboratory values were improved (serum albumin level increased from 2.8 g/dl to 3.0 g/dl) on the 42nd day of nutritional therapy in conjunction with decreased fistula output (2000 ml/ 24 hours to 500 ml/ 24 hours) and increased body weight (49 kg to 51 kg). **Results:** Optimal nutritional therapy improved the outcome of high output ECF patient which accelerate spontaneous closure of the fistula. The nutritional therapy includes adequate calories and protein intake, maintaining fluid and electrolyte balance, as well as multivitamin and glutamine supplementation. **Conclusion:** A proper nutritional therapy for enterocutaneous fistula (ECF) patient could improve patient's nutritional and health status

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Effect of Whey Protein Beverages Consumption on Anthropometric, Defecation and Quality of Life Changes in Overweight and Obese Volunteers

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Keywords: Whey protein · Beverages · Defecation · Quality of life · Overweight/obese

Background/Aims: Overweight and obesity causes non-communicable disease and affects lower quality of life. Currently, Drinks with high protein is alternative choice. There are less Thai studies on the clinical effects of whey protein drinks. The aim of this study was to determine the effect of whey protein beverages consumption on anthropometric, defecation and quality of life changes in overweight and obese volunteers. **Methods:** Parallel-comparison study in eighty adults with overweight and obese. Subjects were equally divided into four groups of treatment: WPS-free with no exercise, WPS-free with exercise, WPS with no exercise or WPS with exercise for 12 weeks. Both WPS groups consumed 29 g whey protein dissolved in 300 ml water twice a day, 30 minutes before breakfast and dinner. Two exercise groups increased their exercise 30 minutes/day, 5 days per week. Defecation was assessed using the Bristol Stool Form Scale-7. Quality of life assessed by questionnaire WHOQOL-BREF-THAI-26. **Results:** The WPS group had no significant change in body weight or muscle mass compares with the WPS-free group but the WPS with exercise exhibited significantly lower%fat and fat mass at 12 weeks (p < 0.05). Fecal appearance and quality of life were analyzed by Chi-square tests (SPSS software version 18; SPSS Inc., Chicago, IL, USA). **Conclusion:** Whey protein beverages intake increased an average frequency of defecation and was correlated with quality of life in better physical health.

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Nutritional Care of Discharge-Planning Services in A Medical Center

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Keywords: Discharge-planning services · Nutritional care · Nutritional problems · Registered dietitians

Background/Aims: Nutritional care, one of the discharge-planning services team during hospitalization, provides medical nutritional therapy to assist patients and their families or caregivers to self-care after discharge and improves quality of medical care. The aim of this study was to evaluate the effect of nutritional care of discharge-planning services in a medical center. **Methods:** This study analyzed the nutritional problems and improvements in nutritional status of patients who have participated in the discharge- planning services of a medical center in Taiwan and cared by registered dietitians. From January to December 2017, there were 2,923 patients, accounting for 28.7% of the total patients who have participated in discharge-planning services, received nutritional care. **Results:** The main route of nutritional support in these patients was tube feeding (84.7%). Further analysis with anthropometry status (n = 2875), 51% patients were abnormal (underweight defined as BMI <18.5 kg/m^2: 22.7%; overweight: 17.4%; obesity: 10.9%). According to the dietary intake status, the prevalence of inadequate caloric and protein intake were 20.8% and 20.7%, respectively. After the dietary intervention, 81.7% and 79.6% of patients improved in caloric and protein intake, respectively. Also, 44.9% of the underweight patients experienced weight gain. **Conclusion:** Nutritional care was effective for patients who involved in the discharge-planning services. Patients with undernutrition status should received nutritional intervention from registered dietitians before discharge to improve their nutritional problems.

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Nutrition Therapy in Critically Ill Overweight Elderly Patient with Heart Failure, Myocardial Infarction, Pneumonia, and Chronic Kidney Disease

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Keywords: Overweight · Elderly · Critically ill

Background/Aims: Overweight or obese will increase the risk of morbidity and mortality from cardiovascular disease. In older people, the risk is higher, but also paradoxically associated with lower mortality rates. Overweight patients vary in body composition and when it coupled with limited reliable sources to make caloric requirements estimation will make nutrition therapy extremely challenging. This case study reveals the nutrition therapy support in critically ill overweight elderly patient with heart failure, myocardial infarction, pneumonia, and chronic kidney disease. **Methods:** An 80-year old moderate malnourished male patient (body mass index 24.6 kg/m^2) with acute lung edema, cardiogenic shock, myocardial infarction, pneumonia, and chronic kidney disease was admitted in the cardiovascular intensive-care unit. The patient was treated with diuretics, vasopressor support, and antibiotics. Oral intake was reduced due to shortness of breath and loss of appetite. The physical examination revealed basal lung rales, wheezing, muscle wasting, edema. Blood tests showed hyperkalemia, leucocytosis, depletion of the immune system, hyperuricemia, hypoalbuminemia, and dyslipidemia. The patient was on stage 5 renal failure (GFR 6.2 mL/min) but refused hemodialysis treatment. Nutritional therapy was given gradually with calorie target 1900 kcal and protein 0.6–1.2 g/ideal body weight/day using normal foods, oral nutrition supplement, and amino acids parenteral nutrition. After 13 days of nutritional treatment, the patient was discharged from the hospital with no shortness of breath, adequate nutrition intake, increased renal function (GFR 22.4 mL/min), and improvement of the blood test result (immune system, uric acid, albumin, and lipid profile). **Conclusion:** Critical ill overweight elderly patients are hypercatabolic and have increased nutrient demands. Nutritional support in these patients is required to provide necessary nutrient substrates and to alter the course and outcome of the disease.

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Improvement of Triglyceride Level but not on LDL, HDL and Total Cholesterol after Giving Papaya Leaves Jelly in Prediabetic Women

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Keywords: Papaya leaves · Lipid profile · Prediabetic · Woman

Background/Aims: Individuals with prediabetes are already at risk for cardiovascular disease. Early detection at a prediabetic stage and treatment of lipid abnormalities can prevent them from developing type 2 Diabetes Mellitus and hence preventing morbidity and mortality furthermore. Papaya leaves were known to have effects on improve their lipid profile. The aim of the study was to assess the effect of papaya leaves jelly on lipid profile. **Methods:** This experimental study was a pretest posttest controlled group design with prediabetes women in 2 groups consumed jelly everyday for 20 days : treatment group (24.6 grams papaya leaves jelly containing 182.4 mg chlorophyll) and control grup (24.6 grams jelly with green dye). Fasting blood sugar levels was measured using Glucose Oxidase Phenol 4-Aminophenazone (GODPAP). LDL, HDL, total chosterol, tryglyceride level was measured using Cholesterol Oxidase Para Aminophenazone (CHOD-PAP). As confounding we measured energy, protein, fat, and carbohydrate intake using 3 days recall in 3 non consecutive days and physical activity using International Physical Activity (IPAQ) in 3 times. Paired t test were used for within group, while Independent t test

and Mann-Whitney were used between groups. **Results:** There was a signifcant reduction on tryglyceride levels (p = 0.014) in the treatment group, while there was no differences in tryglyceride (p = 0.407), LDL (p = 0.923), HDL (p = 0.749) and total cholesterol (p = 0.277) between groups. **Conclusion:** Consumption of papaya leaves jelly can reduce triglyceride levels significantly in treatment group.

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Amount Rather than Source of Dietary Protein Intake is Associated with Skeletal Muscle Mass in Middle-Aged and Older Chinese Adults

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Keywords: Skeletal muscle mass · Sarcopenia · Dietary protein · Animal protein · Plant protein

Background/Aims: Previous studies have demonstrated that dietary protein intake plays an important role in preventing muscle loss, but the role of protein quality in preserving skeletal muscle mass is unclear. The present study examined the associations of quantity and quality of dietary protein intake with skeletal muscle mass in middle-aged and older Chinese adults. **Methods:** This study was conducted in 3213 local residents (men/women: 1044/2169) aged 40–80 years who participated in the Guangzhou Nutrition and Health Study (GNHS) from 2011–2013. Dietary information was collected with a food frequency questionnaire. Appendicular skeletal muscle mass was measured using dual-energy X-ray absorptiometry. **Results:** After adjusting for potential covariates, compared with participants in the lowest quintiles of relative dietary intake of total protein, animal protein, and plant protein, both sex in the highest quintile had a significantly higher skeletal muscle index (SMI). Odds ratios (95% confidence intervals) for low muscle mass (LMM) among the top quintile of men and women were 0.09 (0.04–0.20) and 0.08 (0.05–0.14), respectively, for total protein; 0.61 (0.37–0.98) and 0.55 (0.39–0.77), respectively, for animal protein; and 0.48 (0.29–0.78) and 0.64 (0.45–0.90), respectively, for plant protein (all p-trends<0.05). However, the ratio of animal protein to plant protein was not related to either SMI or the risk of LMM. **Conclusion:** Higher relative dietary intake of total protein, animal protein, and plant protein, regardless of the ratio of animal protein to plant protein, was associated with increased SMI and reduced risk of LMM in middle-aged and older Chinese adults.

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A Systematical Review of Food Intake Monitoring Tools of Patients in the Hospital Setting

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Keywords: Food intake · Assessment tool · Hospital

Background/Aims: This study aims to systematically review the publications on food intake assessment tools and to study the validity of these tools for the general hospital population. **Methods:** English-language full-text research articles reporting food intake monitoring tool of patients in the hospital setting were searched using five electronic databases (MEDLINE/PubMed, EBSCO, Scopus, and Science Direct).The process were assessed using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A total of 22 articles evaluated the dietary assessment tools among adults in hospital setting were included. More than half (n = 13) were performed in Europe, four from North America (three from USA and one from Canada), three from Japan, and one each from Australia and Indonesia. **Results:** Most studies used a paper based dietary assessment tool, except five studies which used the digital-based dietary assessment tools. Half studies (n = 11) validated a newly-developed dietary assessment instrument. Of the 22 studies included, only twelve studies provides differences in energy (kcal) and protein (g) compared to references. Meanwhile, ten studies used level of agreement, sensitivity (Se)-Specificity (Spe), or Kappa to compare the dietary assessment instrument with the references values.These validation studies have generally found that visual estimation tools are valid as compared to weighing method. **Conclusion:** The present review highlights a limited robust studies evaluating food intake assessment tool for hospitalized patients, which mostly studied in European countries.Existing literature demonstrates the substantial variability between methods, with under- and over-estimation of intake being frequently observed.

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What We Eat and Where We Work, Is What We Become: Worksite Food Environment Exposure and Cardio-Metabolic Health among Employed Adults of Urban Delhi, India

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Keywords: Metabolic syndrome · Worksite food environment · CVD · Urban India · Cardio metabolic risk

Background/Aims: The incidence of metabolic syndrome (MS) which is a predictor of increasing CVD is on the rise among adults in urban India. The present study was designed to measure the prevalence of cardio metabolic risk (CMR) as per MS, among

employed adults in Delhi, India. **Methods:** Study design was a cross-sectional study. Anthropometric and biochemical measurements were carried out using standard techniques on apparently healthy males and females (n = 455) working in various government and private organisations in Delhi, India after obtaining ethical permissions. **Methods:** It was found that more than one-third of the study population had MS (43.8%). A significant difference in the prevalence of MS was seen among males (34.7%) and females (57.5%, p < 0.05). The prevalence of MS components was: abdominal obesity (54.3%), hypertriglyceridemia (61.9%), hypertension (56.6%), hypertriglyceridemia (27.4%), low HDL-c levels (63.7%). CMR (assessed from 0–5, where 0 means no MS). It was found that CMR increased with age (β: 0.01; 95% CI: 0.009, 0.01; p = 0.000) especially among females (β: 0.29; 95% CI: 0.19, 0.38; p = 0.000) who were consuming frequent non-vegetarian food (β: 0.04; 95% CI: 0.01, 0.09; p = 0.07), had family history of diseases (β: 0.08; 95% CI: 0.01, 0.18; p = 0.09) and were sedentary workers (β: 0.05; 95% CI: 0.00, 0.10; p = 0.06). Unhealthy worksite food environment characterised by high fast food outlet density (β:0.003; 95% CI: 0.00, 0.007; p = 0.04) in close proximity (β:0.17; 95% CI: 0.36, 0.00; p = 0.05) to worksite were also associated with MS. **Conclusion:** There is a high prevalence of individual components of MS and overall prevalence of MS. Food environment and physical inactivity were two paramount factors resulting in increased CMR among the study population.

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Analysis of the Effect of Fish Bars Made of Bilih Fish (*Mystacoleuseus padangensis* Blkr) Flour to Reduce Oxidative Stress in a Diabetic Rat Model

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Keywords: Blood glucose · Oxidative stress · Bilih fish · MDA · SOD

Background/Aims: This study aims to analyze the effect of bilih fish bars (BFB) on oxidative stress based on the levels of MDA and SOD in diabetic rat models. **Methods:** This study used a Randomized Complete Design (RCD). Forty white male rats of the Sprague-Dawley strain were placed into the following five groups: normal and diabetic rats that were fed either the standard feed and metformin, BFB, BFB and metformin or BFF with a zinc dose of 27 mg/kg. A single dose of STZ (40 mg/kg) was used to induce diabetes in the rats. The intervention lasted for 30 days. The differences in MDA and SOD levels between groups were determined with one-way ANOVA followed by Duncan's New Multiple Range Test and significance of statistical level was set at p < 0.05. **Results:** The intervention with BFB and metformin, BFB and BFF resulted in a decrease in blood glucose levels. The levels of MDA in rats that

received intervention with bilih fish were 593.38 ± 33.37 ng/ml for the BFB group and 595.56 ± 47.30 ng/ml for the BFF group, which were both lower compared to the control normal rats (596.5 ± 36.74 ng/ml). The levels of SOD in rats that received intervention with BFB were higher compared to the diabetic rats with standard feed, but this increase was not significant (p > 0.05). **Conclusion:** BFB and BFF lowered blood sugar levels and decrease the oxidative stress levels based on MDA levels in a diabetic rat model.

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Nutritional Content, Glycemic Index and the Acceptability of Ganyong-Kelor Snack Bar as an Alternative Snack for Type 2 Diabetes Mellitus Diet

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Keywords: Snack bar · Ganyong (Canna edulis) · Kelor leaf (Moringa oliefera) · Diabetes mellitus

Background/Aims: Hyperglycemia in T2DM is progressive so it is necessary to control blood glucose of T2DM by consuming food which has a lower glycemic index. Ganyong (Canna edulis) and kelor (Moringa oliefera) are local foods that have a low glycemic index and high fiber. Amylose and fiber content affect the glycemic index of a food. The objective of this study was to analyze the nutrient content, glycemic index, and acceptability of ganyong and kelor snack bars as an alternative to the T2DM diets menu. **Methods:** Subject in this study was 10 people were given 2 treatments. The first treatment was given bread as standard food. The second treatment was given ganyong and kelor snack bars from the selected formula. The measurement of the glycemic index of the snack bar was done by comparing blood glucose levels of subjects after consumption of standard food and snack bar measured in the 0th, 30th, 60th, 90th and minute 120 after the subject is fasted for 10 hours. Each treatment is given an interval of 7 days. Every 100 g of ganyong and kelor snack bars that use 15 g of ganyong-flour and 1 g of kelor leaf-flour contain 31.78 g carbohydrates, 9.42 g fat, 4.80 g protein, 2.77 g fiber and 10.07 g amylose . The glycemic index of ganyong and kelor snack bars is 38.08 with glycemic load 13.87. **Conclusion:** Selected formula snackbar products from ganyong and kelor can be used as an alternative to T2DM diet menu because it is classified as a food with low glycemic index.

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Combined Patient-Generated Subjective Global Assessment and Body Composition Facilitates Nutritional Support in Inflammatory Bowel Disease

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Keywords: Inflammatory bowel disease · Body composition · FFMI · PG-SGA · Dietary

Background/Aims: Malnutrition is commonly diagnosed in patients with inflammatory bowel disease (IBD). Few clinical studies have adequately explored the importance of body composition in the nutritional assessment of Chinese patients with IBD. **Methods:** A total of 78 IBD patients were enrolled, and Patient-Generated Subjective Global Assessment (PG-SGA) was used to assess malnutrition. Bioelectrical impedance analysis was used to analyze the body composition of IBD patients and their fat free mass indexes (FFMI) were also calculated. FFMI values $<17 \text{ kg/m}^2$ in men and $<15 \text{ kg/m}^2$ in women were considered low. Food consumption data were collected using the semi-quantitative food frequency questionnaire. **Results:** Of the 78 patients, 62.8% had low-FFMI. Among the patients with PG-SGA <4, 41.4% had altered body composition with low-FFMI. FFMI negatively correlated with the PG-SGA scores and disease activity. No statistically significant differences in fat free mass (FFM) and skeletal muscle mass were observed between patients in the active phase and patients in remission ($p > 0.05$). However, the fat mass and visceral fat area of patients in remission were higher than those of patients in the active phase ($p < 0.05$). The average energy derived from fat, proteins and carbohydrates was $29.59 \pm 8.45\%$, $10.40 \pm 1.97\%$ and $60.26 \pm 9.33\%$, respectively. Our study shows that 41.4% of IBD patients had altered body composition despite being well-nourished according to the PG-SGA. Patients in the remission phase presented with fat accumulation and their FFM remained low. The dietary pattern was not adequate among the IBD patients, especially regarding protein intake. **Conclusion:** Both PG-SGA and body composition analysis are importance to be used in the nutritional assessment of patient with IBD.

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Relationship between Vitamin D Serum Level and the Degree of Acne Vulgaris in High School Adolescents Students

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Keywords: Vitamin D · Acne vulgaris · Adolescents

Background/Aims: Acne vulgaris (AV) is a chronic inflammatory disease as a part of pilosebaceus, occurs during puberty, young adults, and many occur in adolescents. AV affects 85% of young adults aged 12–25 years, consistently occupies "the top three most prevalence skin conditions" in the general population. One of the factors that influence AV, which is still a debate is nutritional factor. Vitamin D is a nutrient that is closely related to the skin. Previous studies that linked vitamin D levels with acne still not conclusive, especially in adolescents. This study aims to find a relationship between vitamin D serum level and the degree of acne in adolescents. **Methods:** This cross-sectional study that compares the mean values of vitamin D serum levels between two groups of acne degree in adolescents of high school students aged 15–18 years in the city of Depok. The subjects was divided into 2 groups, 30 in the group of mild AV and 30 of moderate-severe AV. **Results:** The mean of vitamin D serum level of all subject was 17.29 ± 6.77 ng/ml. In the mild group was 15.45 ± 6.7 ng/ml and moderate group was 19.13 ± 6.8 ng/ml with $p = 0.034$. A significant association was found between vitamin D serum levels and the degrees of AV. **Conclusion:** vitamin D associated with severity of Acne vulgaris

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Effect of a Balanced and Sustainable Diet Using Mobile Application on Insulin Resistance among Obese Women: A Randomized Clinical Trial

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Keywords: Obesity · Insulin resistance · Sustainable diet · Application

Background/Aims: Insulin resistance is a common attribute for obesity. A balanced diet with calorie-restriction requires a novel way that considers sustainable foods due to issues of obesity and climate changes and may improve insulin resistance. We examined the effect of a balanced and sustainable diets using mobile application "EATsUp" on the change of HOMA-IR (the Homeostasis Model Assessment of Insulin Resistance) as an insulin resis-

tant marker. **Methods:** A double-blind randomized clinical trial was conducted involving 56 obese women aged 19–59 years with body mass index (BMI) ≥25 kg/m^2 in Jakarta and/or Depok Cities. Subjects were selected randomly and stratified based on age group (<40 or ≥40 years old) to receive either an intervention with mobile application of balanced and sustainable diet, or balanced diet only group. Both groups were asked to comply with the menu recommendations, self-monitoring using the application, weekly dietary counseling and sport gathering for eight weeks. HOMA-IR was assessed before and after the intervention. The demographic characteristics including age, nutritional status, waist circumference, physical activity level, education, occupation and place of residents in both groups were comparable. **Results:** At baseline, there was no difference in HOMA-IR in the intervention or control group. Although there was a significant reduction of HOMA-IR within intervention group, the difference in the mean reduction of HOMA-IR after intervention [(–0.87 ± 1.27) vs (–0.29 ± 1.21), p > 0.05] between groups was not significantly different after adjustment for BMI. **Conclusion:** An eight-week of balanced and sustainable dietary application intervention did not reduce elevated HOMA-IR level compared with a balanced diet mobile application.

Risk Factors of Morbidity During Pregnancy in West Jakarta, Indonesia

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Keywords: Dehydration · Morbidity · Nutritional status · Pregnant women

Background/Aims: Maternal morbidity during pregnancy is one of the quality indicators in obstetric care. This study was aimed to analyze the risk factors of maternal morbidity during pregnancy. **Methods:** This was a cross-sectional study in a health centers of, Kebon Jeruk, West Jakarta involving 67 pregnant women. Morbidity status were observed by five (5) illness indicators such as: fever; painful urination, frequent, and less, yellowish eyes and skin, dark urine, dizziness, pale, listless, and tiredness, breathlessness, or shortness of breath. All measurement was carried out from December 1st, 2016 to March 31st, 2017 by well trained professional health personnel's. Means difference test was employed. **Results:** About 40.3% of pregnant women has a high score of morbidity. The average of MUAC (Mid-Upper Arm Circumference), birth weight, birth length, haemoglobin, and urine osmolality were 27.1 ± 3.5 cm, 57.4 ± 10.1 kg, 154.0 ± 4.2 cm, 11.5 ± 1.0 g/dL, 549 ± 309 mOsm/kg, respectively. There's no differences of mother's aged, MUAC (Mid-Upper Arm Circumference), weight, height, and hemoglobin between dehydrated and normal groups (p≥0.05). MUAC, haemoglobin, hydration status and mother's behaviour were not influencing morbidity status (p≥0.05). There is a possibility that pregnancy morbidity associated directly with sanitation status and other ecologic factors of pregnant women. **Conclusion:** In this study, nutritional factors such as MUAC, haemoglobin and hydration status are not directly associated with the morbidity.

The Effect of Green Bean Yogurt (Vigna Radiata L.) on Lipid Profiles in Sprague Dawley Rats With High Fructosa Feeding

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Keywords: Metabolic syndrome, Dyslipidemia, Green bean yogurt, Lipid profile

Background/Aims: Dyslipidemia in the form of high triglyceride levels, cholesterol, LDL, and low HDL are components of the metabolic syndrome. Dyslipidemia can be prevented by consuming foods that have hypolipidemic effects such as high fiber and isoflavones. One of the foods that has this effect is green beans. The process of fermentation of green beans into yogurt is expected to increase the hypolipidemic effect. **Objective:** To determine the effect of giving green bean yogurt to the lipid profile of male Sprague Dawley mice given a high-fat high carbohydrate diet. **Method:** True experimental research type with pre-post test design. 28 male Sprague Dawley rats were adapted for 7 days. A total of 21 mice were given a high-fat fructose diet for 14 days. Rats were divided into 4 treatment groups namely negative control, positive control, yogurt diet 2.5 ml/200grBB, and yogurt diet 5 ml/200grBB. The intervention was carried out for 28 days by taking blood serum before and after intervention. **Results:** Giving green bean yogurt dose 2.5 ml/200grBB significantly reduced (p < 0.05) total cholesterol level (29.62%), triglycerides (21.36%), LDL (31.25%) and significant (p < 0.05) increasing HDL (11.29%). At a dose of 5 ml/200grB, it significantly reduced (p < 0.05) total cholesterol levels (65.15%), triglycerides (46.79%), LDL (55.86%) and significantly (p < 0.05) increasing HDL (42.93%). **Conclusion:** Giving green bean yogurt can improve lipid profile by reducing total cholesterol, triglycerides, and LDL levels and increasing HDL levels significantly.

Innovation of Tuna Cookies and Its Effect on Albumin Level and Nutritional Status of Underweight Children

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Keywords: Cookies · Albumin · Consumption · Malnutrition

Background/Aims: Undernutrition children, especially among 6–24 months old is still prevalent in Indonesia, including in East Java. One of the food approach interventions could be

done to address this problems is through optimizing local food utilization. This study aimed at developing a local food product innovation made from local millet (foxtail millet) from Gemaharjo, Pacitan district of East Java to be consumed by underweight children. **Methods:** The food product called "Tuna cookies' (TC) was developed using the local food namely local millet (foxtail millet) and tuna fish. Then a clinical study of the TC as a food supplement was applied to 359 children aged 6–24 months for 3 months. The outcome be measured in this study were blood albumin and nutritional status (W/A) of the subjects. **Results:** The nutritional value of the TC was 359 calories and 20 grams of protein per 160 grams of cookies. The result of the clinical study showed that TC supplementation could increase protein albumin (p = 0.02), and nutritional status (p = 0.02) of the underweight children. **Conclusion:** Supplementation of tuna cookies could increase albumin level and nutritional status of under-weight children.

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Formulating Diet for Transitional Feeding in Tuberculous Meningitis Patient after a Period of Home Healthcare

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Keywords: Tuberculous meningitis · Transitional feeding · Nutritional support
Background/Aims: Nutritional management and transitional feeding are known to play an important role in immobilized patient to prevent malnutrition. Unfortunately, long-term using tube feeding will impaired normal process of recovery major disease and risk to secondary infection. Adequate intake of macronutrients and micronutrients before, during, and after rehabilitation can affect morbidity, mortality, and improving immune system, cognitive and functional capacity. **Methods:** We present a case of a 25-year-woman was consulted by a neurologist with tuberculous meningitis and decubitus ulcer. The chief complaint was no intake since last 9 days because of loss consciousness. There was fever and seldomly cough. From physical examination, we found sign of anemia, dermatitis in neck, armpit and back, decubitus ulcer and limb paralysis. From laboratory examination, there were normocytic normochromic anemia, immune depletion, hypoalbuminemia, hyponatremia, hyperlipidemia and elevated liver transaminase. Nutritional therapy, by giving enteral nutrition to reach the calorie target, contained of high protein and choline ONS (oral nutritional supplement), blenderized diet. vitamin A, B complex, C, D, zinc, and cork fish extract as the source of albumin, immunonutrient such as fish oil as supplementation were given. **Results:** After 35-day treatment, there were increased of plasma albumin and lymphocyte level, accelerated wound healing, dermatitis, and functional capacity. Home healthcare visit for about 1-month and physiotherapy to support oral feeding from liquid to blenderized diet until porridge and improve cognitive and functional capacity. **Conclusion:** Optimal nutritional support with transitional feeding to enhance adequate intake can accelerate wound healing, decrease morbidity and mortality rate in tuberculous meningitis patient.

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Effect of Potato Rice Noodle on the Major Blood Index in Elder Population

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Keywords: Potato rice noodle · Staple food · Haemoglobin · Blood sugar and blood lipids
Background/Aims: Rice noodle is popular in Chinese diet. A combination of potato and rice to produce a new formulated noodle might have health benefits. The study aimed to evaluate the effect of 30% potato rice noodle on hemoglobin, blood sugar and blood lipids in elder population. **Methods:** As many as 581 people aged 60 years and above selected in Tiandeng country in Guangxi Province were randomly divided into intervention group (284 people) and control group(297 people). The elderly in intervention group received 800 grams of potato rice noodle per week for 6 months, and people in control group maintained a normal diet. Before and after 6-month intervention, fasting blood glucose, hemoglobin, and blood lipids were examined, and the amplitude of variation of all indicators were compared. **Results:** After 6-month intervention, the fasting blood glucose did not increase in intervention group, but increased in control group, and the difference was statistically significant (Male :P = 0.0045, Female: P < 0.0001). The hemoglobin increased in both male and female in intervention group, but decreased in control group, and the difference was statistically significant. (P < 0.0001). The increase of triglycerides (TG) in intervention group was significantly lower than that in control group (Male: P = 0.0221, Female: P = 0.0178). Among males, total cholesterol(CHOL), high-density lipoprotein cholesterol(HDLC) and low-density lipoprotein cholesterol(LDLC) in intervention group were all decreased, whereas increased in control group, with statistically significant differences(P = 0.0004, P = 0.0011, P = 0.008). **Conclusion:** Consumption of 30% potato rice noodle has a certain control effect on blood sugar and blood lipids in the elderly population, and can increase hemoglobin level. The staple food made of potato has certain promotion effect on the health of elderly people and can partly replace the traditional staple food.

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Nutritional Therapy in Rectal Carcinoma Patient with Anemia, Depletion of Immune System and Hypoalbuminemia

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Keywords: Rectal carcinoma · Anemia · Hypoalmuminemia
Background/Aims: Rectal Carcinoma is the most malignant tumor among gastrointestinal malignant tumors. Malnutrition in patients with carcinoma negatively affects the therapeutic response, complications, quality of life and survival of patients. Nutritional interventions can prevent and improve malnutrition. **Methods:** A 31 years old woman was consulted by surgical department with rectal carcinoma is planned for surgery. The chief complaint was decrease of food intake since the last 5 months due to loss of appetite. The patient was diagnosed with severe malnutrition (BMI 15.9 kg/m^2). Laboratory finding ; normocytic normochrome anemia (Hb 11.5 g/dl), Total Lymphocyte count (TLC 1890/μL), hypoalbuminemia (albumin 2.7 g/dL). Physical examination: anemic conjunctiva, loss of subcutaneous fat, there is a lump in the pubic region with a diameter of 3 cm, and wasting. Nutritional therapy by giving energy 1700 kkal, protein 74 gr, carbohydrates 212 gr, fat 62 gr. Supplementation with Vitamin A, B complex, Zinc, and extract snakehead fish (450 mg). **Results:** After 15 days of nutritional intervention, patients condition was improved as well as blood test for hemoglobin, TLC, and albumin, thus the patient is able to undergo surgery. Macronutrients and micronutrient nutrition interventions, monitoring, and nutrition education are needed to support the improvement of the patient's clinical condition. **Conclusion:** Certain nutritional therapy given to Rectal Carcinoma Patient with anemia improved her nutritional statu.

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Adequate Protein Intake in CKD Patient Admitted to the Hospital

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Keywords: CKD · Parenteral nutrition · Protein
Background/Aims: Malnutrition is common in CKD patients and this is related to occurrence of Protein Energy Wasting, decreased quality of life and increases in morbidity and morbidity. The daily protein requirements of CKD patients who are on dialysis are quite high at 1.2–1.5 g/Kg BB/day. One indication of PN administration is when inadequate enteral intake is appropriate. **Methods:** A 29-year-old woman was treated in the Lontara 1 with CKD. On report, patient complained inability to eat and drink through oral route due to decreased consciousness on the

last 2 days. Blood pressure was found 160/100 mm Hg. Laboratory tests found anemia (Hb 9.0 g/dl), hypoalbuminemia (2.4 g/dl) and increased serum urea and creatinine (10.3 and 215 mg/dl). Nutritional status is moderate malnutrition. Nutritional therapy was given energy target of 2000 kcal, 62.5 g protein, 250 g carbohydrates and 83.3 g fats. Food intake through oral and parenteral route. **Results:** There was an improvement in the size of the upper arm circumference from 24.5 cm in the second week of treatment and increased to 24.7 cm in the third week of treatment. Laboratory parameters such as Hb was found 10.4 g/dl, albumin improved to 3.2 g/dl, urea and creatinine to 2.14 and 84 mg/dl. **Conclusion:** Provision of optimal protein for dialysis patients is very important, where parenteral amino acid administration was found to have the ability to improve the patient's condition.

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Fast Tract Recovery Surgery with Whey Protein Infused Carbohydrate Loading and Early Oral Feeding among Surgical Gynaecologic Cancer Patients

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Keywords: Recovery · Surgical gynecologic cancer
Background/Aims: Fast track recovery (FTR) surgery, a set of perioperative protocols, aims to promote recovery, preserve muscle mass and reduce length of post-operative hospital stay (LPOHS) and complications. **Methods:** This Randomized Control Trial recruited 62 subjects as intervention group (CHO-P) and 56 subjects as control group (CO) among surgical gynecologic cancer patients. CHO-P group was supplemented with preoperative whey protein infused carbohydrate loading and post-operative early oral feeding while CO was given usual care. **Results:** Mean age was 50 years old (CHO-P) and 51 years old (CO). CHO-P group had shorter LPOHS (72 hours vs 128 hours, p < 0.01), less post-operative nausea and vomiting (17% vs 24%, p < 0.01), lower readmission rate within one-month post-operative (6% vs 16%, p < 0.05) as compared to CO. CHO-P was found to give better results, as compare to CO, in differences of body weight (−0.3 ± 2.3 kg vs −2.1 ± 2.3 kg, p < 0.01), muscle mass (0.4 ± 1.7 kg vs −0.7 ± 2.6 kg, p < 0.01), C-reactive protein-albumin ratio (0.3 ± 1.2 vs 1.1 ± 2.6, p < 0.05) and hand-grip strength (0.6 ± 4.3 kg vs −1.9 ± 4.7 kg, p < 0.01) throughout hospitalization. There were no significant difference in mid upper arm circumference and serum albumin level between groups upon discharged. FTR surgery shortened the LPOHS without increasing complications. **Conclusion:** Preoperative whey protein infused carbohydrate loading and postoperative early oral feeding as-

sures a better postoperative nutritional outcome, muscle strength preservation and suppressed postoperative acute-phase inflammatory marker.

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Rice Protein Stimulates Glutathione Synthesis in Rats

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Keywords: Rice protein · Glutathione synthesis · Antioxidant · Rats

Background/Aims: Rice protein is a major plant protein widely consumed in the world, and glutathione is an endogenous antioxidant. The major aim of this study is to elucidate the effects of rice protein on stimulating glutathione synthesis in growing and adult rats. **Methods:** Adult male Wistar rats were fed with casein and rice protein for 2 weeks. Hepatic contents of glutathione contents, glutathione synthesis and glutathione metabolism related enzymes' activities, gene and protein expressions were measured after 2 weeks feeding. Differences between groups were examined for statistical significance using one-way analysis of variance (ANOVA) followed by the least significant difference test. The criterion for significance was $p < 0.05$. **Results:** Compared with caseins, rice proteins increased glutathione level ($p < 0.05$) and regulated hepatic activities of glutamate cysteine ligase (GCL) ($p < 0.05$), glutathione S transferase (GST) ($p < 0.05$), glutathione reductase (GR) ($p < 0.05$) and glutathione peroxidase (GPx). With the intake of rice proteins, the gene and protein expressions of glutamate cysteine ligase catalytic subunit (GCLC) ($p < 0.05$), glutamate cysteine ligase modulatory subunit (GCLM) ($p < 0.05$), glutathione synthase (GS), glutathione S transferase (GST) ($p < 0.05$), glutathione reductase (GR) and glutathione peroxidase (GPx) were stimulated in growing and adult rats. **Conclusion:** The present study demonstrates rice protein can induce antioxidant activity through stimulating glutathione synthesis in growing and adult rats.

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The Influence Factors of Energy Metabolism of Patients with Mechanical Ventilation after Cardiac Valve Surgery Undergoing Cardiopulmonary Bypass

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Keywords: Cardiopulmonary bypass · Resting energy expenditure · Valvular heart disease

Background/Aims: This research aimed to measure the resting energy metabolism of patients undergoing selective heart valve operation and to explore the influence factors of energy cost in patients after surgery. **Methods:** A total of 72 patients undergoing cardiopulmonary bypass for open heart surgery was studied prospectively. The patients undergo the open heart surgery of heart valve disease were included. Resting energy expenditure (REE) was measured after the operation by means of indirect calorimetry. Clinical data was recorded, including gender, height, body weight, body temperature, duration of operation, CPB time, aortic blocking time, blood lactic acid and blood glucose level. **Results:** REE of the first day (REE1) of mechanical ventilation after surgery is 1952.92 ± 453.63 kcal/d, while REE of the second day (REE2) of mechanical ventilation is 1953.89 ± 403.98 kcal/d. There are a positive correlativity between REE and body weight, BMI and body temperature in male patients ($p < 0.05$). In female patients, REE1 shows a positive correlation with body weight, BMI, body temperature and blood lactic acid level ($p < 0.05$). Female patients' REE2 has positive correlation with body weight, BMI, CPB time and aortic blocking time ($p < 0.05$). The results of multiple linear regression suggest that body temperature is the biggest factor influence the male patients' REE1, followed by body weight. BMI, body temperature and the level of blood lactic acid in female patients respectively. **Conclusion:** The metabolic state of patients after valvular heart disease surgery is associated with gender, body size and body temperature. The increase of operation time, CPB time, blood lactic acid may increase females' energy expenditure.

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Association between Nutrition Counseling Frequency, Physical Activity, Diet Compliance and Fasting Blood Sugar Levels among Diabetes Mellitus Patients in RSUD Pasar Rebo

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Keywords: Counseling · Type 2 DM · Diet compliance · Fasting blood sugar · Physical activity

Background/Aims: Type 2 diabetes mellitus (T2DM) is a chronic condition characterized by increased concentration of blood glucose caused by insulin resistance. Diabetes mellitus management consist 4 pillars, which are nutrition education, physical activity, diet therapy and pharmacology therapy. The purpose of this research is to investigate the association between nutrition counseling frequency, physical activity level and diet compliance to fasting blood sugar levels among type 2 diabetes mellitus patients. **Methods:** This research was conducted in RSUD Pasar Rebo by applying a cross sectional study design. The respondents in this study were 41 patients in Pasar Rebo hospital who diagnosed type 2 DM. Subjects for this study were selected by purposive sampling. Data were analyzed using Chi Square to figure out the association between variables. **Results:** There was a significant association between fasting blood sugar levels with nutrition counseling frequency ($p = 0.033$), physical activity with ($p = 0.002$), and diet compliance ($p = 0.000$). It concluded that the better frequency of nutritional counseling and compliance to diet and physical activity the better fasting blood sugar levels. **Conclu-**

sion: T2DM patients are expected to adhere to an appropriate diet, increase physical activity and follow nutritional counseling given by nutritionist.

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Case Report: Increasing Myasthenic Crisis Patient's Functional Capacity by Means of Optimal Nutrition Support

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Keywords: Myasthenic crisis · Optimal nutrition

Background/Aims: Myasthenic crisis is a complication of myasthenia gravis characterized by worsening muscle weakness resulting in respiratory failure which eventually require intubation and mechanical ventilation. Nutritional support with optimal energy and protein intake act as a key component for positive clinical outcome. **Methods:** A 37-year-old female had been admitted to the Intensive Care Unit due to Myasthenic Crisis. Patient was intubated and breathing supported with mechanical ventilation. Nutritional intake was given by enteral route. Nutritional status by Subjective Global Assessment (SGA) showed moderate malnutrition. Laboratory assessment revealed hypoalbuminemia (2.7 g/dl), low haemoglobin (11.5 g/dl), low lymphocyte count (1070/μL), leukocytosis (34.400/μL), and elevated liver enzymes (GOT/GPT = 309 U/L/609 U/L). Gastrointestinal function was normal. Energy calculation was initiated at 1200 kcal was increased gradually as tolerated untill 1800 kkal. Protein composition is 1.7 g/kg IBW (82.62 g) or 27.54% of total calorie. Carbohydrate and fat composition are 45% (135 g) and 20% (28 g) of total calorie intake, respectively. The nutritional therapy included zinc 20 mg and Snakehead fish capsule extract.450 mg. Patient carried out our feeding regimens completely with 100% food recall per oral by day-13. **Results:** After 20 days, there were some improvement both clinically and by laboratory parameters marked by weaning off from bilevel positive airway pressure machine, handgrip dynamometry power increment (5.8 kg to 11.4 kg), elevated lymphocyte count, elevated albumin level(2.7 g/dl to 3.7 g/dl), decreased leukocyte count and decreased hepatic liver enzyme. **Conclusion:** Optimal nutritional support for myasthenic crisis, improve immunity and increases functional capacity.

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Effectiveness of Oral Nutrition Supplement on Nutritional Outcomes among Head and Neck Cancer Patients Attending Radiotherapy Clinic

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Keywords: Head cancer · Neck cancer · HNC · ONS · Nutrition supplement · Nutritional outcome

Background/Aims: Head and neck cancer (HNC) patients are at greater risk of malnutrition even prior to treatment. Provision of oral nutrition supplement (ONS), dietary consultation and frequent follow up can be beneficial in improving their nutritional status. However, as provision of ONS is only provided for inpatients, thus putting the outpatients at greater risk of having malnutrition due to non-compliance to self-purchased ONS. **Methods:** A pragmatic randomised controlled trial study was conducted to ascertain the effectiveness of intensive nutrition intervention (INI) (provision of ONS, dietary consultation and frequent follow up) vs routine care (RC) among HNC outpatients undergoing treatment in radiotherapy clinic. A total of 40 subjects were recruited with 20 subjects per each group. Changes in weight, body mass index (BMI), fat mass (FM) and muscle mass (MM) were observed and analysed. **Results:** Significant weight loss (p < 0.001), reduction in BMI (p < 0.001), lower FM (p < 0.001), and reduction in MM (p < 0.001) within subjects in both groups were observed but only weight loss (p = 0.041) and reduction in BMI (p = 0.025) were significantly difference between groups. INI group had lower percentage of weight loss (7.5%) as compared to RC group (9.7%). INI prevents further weight lost in HNC outpatients when compared to RC. **Conclusion:** Combination of ONS provision, dietary consultation and frequent follow up can be adapted in outpatient setting as standard procedures in HNC dietary care against the malnutrition.

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Effect of Zinc Deficiency among Urban Non-Pregnant Women in India

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Keywords: Zinc deficiency · Dietary intake · Serum zinc · Non-pregnant women

Background/Aims: Zinc deficiency negatively affects during pregnancy. It's not known whether pregnancy leads to zinc deficiency due to increased fetal needs or whether the women are zinc deficient when they become pregnant. There is scanty information available on prevalence of zinc deficiency in India. Present study assessed the effect of zinc deficiency among non-pregnant women. **Methods:** A community-based cross-sectional survey was carried out in urban areas of two districts, Dharwad and Bangalore North of Karnataka state, India. All women were aged between 18 to 30 years and were willing to participate. A structured pretested interview schedule was developed to elicit information on various aspects of health and nutritional status. Serum zinc levels of sub sample were assessed and zinc levels less than 60 μg/dl were considered zinc deficient. **Results:** The 'F' test results showed significant difference with respect to intakes of sugar and milk and milk products. No significant difference was found for intakes of cereals, pulses, roots and tubers, green leafy vegetables, other vegetables, fruits and oils. With respect to nutrient adequacy, energy and protein were found to be almost equal to the Recommended Dietary Allowances (RDA) in both the localities while. Other nutrient intake were lower than RDA. Zinc levels were found to be normal in all the sub sample of both the localities. Zinc deficiency may occur during pregnancy due to increased fetal needs but dietary intake is below RDA. Hence, holistic approach in nutrition should be recommended for overall health.

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Biomolecular of Clear Kefir Probiotics Supplementation as Antidiabetic

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Keywords: Probiotic · Kefir · Hyperglycemia · Lipid peroxidation · Antioxidant

Background/Aims: Free radicals may affect hyperglycemia, increase lipid peroxidation, reduced antioxidants and immune response. This study analyzed the effect of clear kefir supplementation on immune response, lipid peroxidation and antioxidant status of hyperglycemia of Type 2 Diabetes Mellitus (T2DM) Patients in Bandung, Indonesia. **Methods:** The randomized control trial was conducted in 108 T2DM patients. Subjects were allocated randomly into: (1) T2DM with HbA1c <7, given clear kefir 200 ml group, (2) T2DM with HbA1c >7, given clear kefir 200 ml, (3) T2DM with standar diet. The intervention was runned for 30 days. Lipid peroxidation measured by spectrophotometry. TNFα, IL10 measured by ELISA. SOD and GPX Antioxidants measured by ELISA. Catalase measured by spectrophotometry. Clear kefir characterization was done by microbiology identification. Data were analyzed by One Way ANOVA and Post Hoc Duncan test with significance level $p < 0.05$. The study was approved by ethic committee. **Results:** Clear kefir supplementation affected on reduction of MDA, increased IL10, antioxidants status. Statistical showed there were respectively increased of IL10 ($p = 0.001$), decreased delta of TNFα ($p = 0.001$) and delta of MDA ($p < 0.001$). SOD level was increased ($p < 0.015$). GPx and CAT were also inceased ($p < 0.001$), except in control groups. Probiotics kefir found as many as 10^f–10^9 cfu/mL and declined to 10^e as the decrease in pH during storage. Probiotics were detected, such as: Lactobacillus Sp, Lactococcus and Acetobacter and Saccharomyces Sp. Kefir supplementation decreased the level of MDA, increased of antioxidants and immune response.

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Co-Occurrence and Appearance Frequency of Food Groups in the Elderly with Its Possible Relationship with Sarcopenia

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Keywords: Food groups · Sarcopenia · Co-occurrence · Appearance freque

Backgroud/Aims: Malnutrition is a serious risk for sarcopenia. Although intake of energy and each nutrient has been mostly analyzed individually, dietary pattern is also of great importance. In this paper, we have studied the co-occurrence and appearance frequency of food groups in the elderly, and analyzed its relationship with sarcopenia. **Methods:** Female subjects visiting orthopedic clinic were evaluated for their anthropometry, body composition, blood test, muscle strength, and physical performance. Dietary intake was assessed by BDHQ (brief-type self-administered diet history questionnaire. Co-occurrence was analyzed by SPSS Textmining software. 157 subjects with full-set of data including lower leg muscle strength (LLMS) and dietary intake were subjected to analysis. **Results:** Subjects with LLMS lower than the median of 4.5N/kg (L-group) had higher age, BMI, percentage of body fat, and lower muscle volume, muscle power, and physical performance than those with LLMS higher than median (H-group). Energy and energy-producing nutrients intake was no different between them. Food groups with higher frequency of appearance were fruits, sugars and sweeteners in L-group, and fish, meat, and beverages in H-group. In L-group, co-occurrence was observed in side dish. In contrast, co-occurrence was dominant in staple, main and side food. **Conclusion:** Intake in L-group was characterized by lower staple food and higher fruits and vegetables; in contrast, balanced intake was observed in H-group. Further studies are needed to show the implication of balanced diet for preventing sarcopenia.

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The Combination of Wheat Peptides and Fucoidan Protects Chronic Superficial Gastritis and Regulates Gut Microbiota: A Double-Blinded, Placebo-Controlled Study

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Keywords: Wheat peptides · Fucoidan · Chronic superficial gastritis · Gut microbe

Backgroud/Aims: Chronic gastritis is believed to affect about half of people worldwide. Traditional medications can lead to adverse effects, therefore, alternative nutritional strategies are needed to prevent the development of gastric mucosal damage. The aim of this study is to evaluate the protective effect of the combination of wheat peptides and fucoidan (WPF), two food-grade bioactive ingredients, on adults diagnosed as chronic superficial gastritis. **Methods:** A randomized, double-blind, placebo-controlled clinical trial was applied to 106 participants. They were randomized either to receive the WPF or the placebo for 45 days. The pathological grading of gastric mucosal damage was scored by experienced physician using gastroscopy. The fecal samples were collected for the determination of calprotectin and short-chain fatty acids (SCFA) levels and metagenomics analysis. The questionnaires for self-reported gastrointestinal discomforts, life quality and food frequency were also collected during the treatment period. **Results:** The WPF 1) reduced gastric mucosal damage level; 2) relieved bloating, stomach pain, acid reflux, belching, loss of appetite and reduced food intake; 3) increased overall satisfaction of health, reduced the impact of physical pain, and improved the ability to concentrate; 4) increased bread, cereals, starch and meat consumption; 5) reduced fecal calprotectin concentration; 6) increased fecal SCFA concentration; 7) increased the abundance of gut microbiota responsible for producing SCFA; 8) increased the abundance of Bifidobacterium, Bacteroides and Eubacterium, while decreased that of Prevotella. **Conclusion:** This study proved the protective effect of WPF on chronic superficial gastritis, as well as clarified its regulation on some critical gut microbiota responsible for producing SCFA.

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Association Between Food Beliefs and Diet Quality in Breast Cancer Patient in Seremban, Negeri Sembilan, Malaysia

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Keywords: Food belief · Diet quality · Breast cancer

Background/Aims: Breast cancer patients are often exposed to misinformation on the food types, which eventually leads them to have certain beliefs and myths in foods. Subsequently, the diet quality of the cancer patient may be affected, which will then influence one's nutritional status. This study is to investigate whether food beliefs in a cancer patient affect cancer patient's nutritional status. **Methods:** A cross-sectional study was applied to 31 breast cancer patients recruited from Hospital Tuanku Ja'afar, Seremban, Negeri Sembilan, Malaysia. Individuals' clinical data, food belief and nutritional status (PG-SGA) were interviewed and assessed. Chi-square test was used to determine the association between food beliefs and nutritional status, and odds ratio were used to determine whether food beliefs increase or decrease the risk of malnutrition. **Results:** Majority patients (71%) had a strong food belief with a median score of 6. Foods avoidance mainly in red meat, egg, poultry, fish and oily foods. Based on PG-SGA, 77% of the patients were well nourished and 23% were moderate/suspected malnutrition. There was no significant association found between food beliefs and nutritional status of the breast cancer patients (p = 1.000). **Conclusion:** Majority patients in this study are well nourished due

to no treatment side effects and able to eat. Patients' strong food beliefs may indirectly affect their nutritional status such as protein-rich food sources avoidance.

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Effect of Drinks and Cookies Contained Galohgor on Biomarker of Liver Function in Type 2 Diabetic Subjects

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Keywords: Galohgor · AST · ALT · Diabetic

Background/Aims: Galohgor is a Sundanese nutraceutical which contains 56 types of medical plants and has health benefits for DM. The aim of this research was to analyze the effect of drinks and cookies of Galohgor on biomarker of liver function (Aspartate Aminotransferase (AST) dan Alanine Aminotransferase (ALT) in type 2 diabetic subjects. **Methods:** This study used single blind Randomized Control Trial (RCT) with cross-over design applied on 11 type 2 diabetic subjects in Cikarawang, Babakan and Balumbang Jaya Village-Dramaga, Bogor District, West Java. Each subject received powdered drinks and cookies contained Galohgor extract 2 grams/day (1 gram of Galohgor extract in the form of drink 8 grams and 1 gram of Galohgor extract in the form of cookies 24 grams) and without Galohgor extract (control) for 38 days treatment with four wash-out period between treatment periods. AST and ALT levels were analyzed by plasma blood sample at pre and post intervention. **Results:** The result showed that the different levels of AST between post and pre intervention on Galohgor group compared to control group were −1.4 ± 3.1 U/L and −0.6 ± 2.7 U/L (p > 0.05). The different levels of ALT between post and pre intervention for Galohgor group compared to control group were −3.0 ± 6.8 U/L and −1.3 ± 5.3 U/L (p > 0.05). **Conclusion:** Drinks and cookies contained 2 gram of Galohgor extract does not affect the AST and ALT level of type 2 diabetic subjects.

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Blood Glucose Level, Leptin and Adiponectin Levels in Diabetic and High Fat Diet Induced Rats

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Keywords: Blood glucose · Leptin · Adiponectin · Diabetes

Background/Aims: Hyperglycemia and diabetes may be triggered by obesity which may affected by high-fat diets. Leptin and adiponectin have opposite effects on subclinical inflammation and insulin resistance. The imbalance between leptin and adiponectin is an important mediator of diabetes mellitus and cardiovascular disease associated with a high-fat diet. The purpose of study was to analyze the effect of high-fat diets on blood glucose levels, leptin and adiponectin levels in diabetic induced rats. **Methods:** This study applied a randomized control design, using Wistar strain

rats which were divided into control groups were given placebo (D0), diabetic group with streptozotocin induction (D1), and diabetic group with streptozotocin induction + high fat diet (D2). The diabetic rats model was developed by administering high-fat diet ad libitum for 30 days and streptozotocin induction (dose of 60 mg/kg BW intraperitoneally) for 7 days. After treatment, all groups of rats were taken blood samples to see blood glucose levels, leptin and adiponectin expression by ELISA technique. Data were analyzed statistically by one way anova test with a 95% confidence level (α = 0.05). **Results:** There was differences in blood glucose levels (p = 0.012) between the control and treatment groups, but there were no differences in leptin levels (p = 0.337) and adiponectin (p = 0.067) between groups. Streptozotocin induction and high fat diet tend to a decrease adiponectin and increase leptin levels, but not statistically significant. **Conclusion:** High-fat diets increase blood glucose level but not on leptin and adiponectin levels in diabetic induced rats

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Meta-Analysis of Dietary Intake and Esophageal Cancer-Specific Mortality

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Keywords: Dietary intake · Esophageal cancer · Mortality · Meta-analysis

Background/Aims: Effects of dietary intake on the prognosis of esophageal cancer are still controversial. This study aimed to explore the effects of dietary intake on esophageal cancer prognosis. **Methods:** Six electronic databases were searched for articles published up to June 2018 that examined the association of intake of diet and its components and esophageal cancer prognosis. Effect sizes of eligible studies were pooled by using random-effects models. A total of 11 studies were included; two focused on dietary folate, eight focused on alcohol consumption and two focused on other dietary components. **Results:** When comparing the highest with the lowest groups, intake of dietary folate was associated with a reduced risk of esophageal cancer-specific mortality in esophageal squamous cell carcinoma (OR: 0.43, 95% CI: 0.23–0.81). Alcohol consumption could increase esophageal cancer-specific mortality in esophageal cancer patients by 43%; however, this effects was not found between alcohol consumption and all-cause mortality. **Conclusion:** The results from meta-analysis with limited evidence suggest that folate intake and alcohol consumption may be associated with the prognosis of esophageal cancer. More studies are needed to investigate the effect of dietary behaviors on esophageal cancer prognosis.

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Indirect Calorimetry: Adhering to the International Gold Standard Approach to Optimize Energy Needs for the Mechanically-Ventilated ICU Patient

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Keywords: Indirect calorimetry · Energy requirements · Intensive care unit

Background/Aims: Suboptimal nutrient provision is associated with malnutrition, prolonged ventilation days, increased length of stay and higher mortality rates in the ICU. Predictive equations for energy requirement estimation is inaccurate when compared to the gold standard Indirect Calorimetry. This study compares the accuracy of predictive equations in estimating energy requirements against indirect calorimetry method, and to test the hypothesis that energy requirements estimated by a simplistic predictive equations is significantly different from that measured by indirect calorimetry. **Methods:** This is a single-center, retrospective cohort analysis conducted in 12 mechanically ventilated patients aged >20 yrs who were admitted to the ICU between January 2016 to December 2018. Energy requirements estimated by a simplistic weight-based equation 25–30 kcal/kg/day (ASPEN 2016 guidelines) were compared against measured energy requirements with indirect calorimetry using the Wilcoxon Signed rank test. **Results:** The hypothesis was proven that there is a significant difference of 499 ± 75 calories/day (p < 0.01) between estimated energy requirements with predictive equations compared to Indirect Calorimetry. Predictive equations significantly under-estimated energy requirements and had low performance when compared to the indirect calorimetry method. There is a significant improvement of 38 ± 11.25% (p < 0.01) in energy provision after intervention- an improvement of 270 ± 11.25 calories/day (p < 0.01). This result has led to a change of nutrition prescription in 83% of our analyzed patients. **Conclusion:** Predictive equation do not accurately estimate measured REE in this group of mechanically ventilated ICU patients, mostly underestimating energy needs. We recommend that indirect calorimetry method is needed to provide optimal nutritional delivery and care for mechanically ventilated ICU patients. Alternatively, development of improved predictive equations to assess energy needs is needed.

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Change in Body Weight During Golden Berry (Physalis peruviana) Juice Intervention of Diabetes Rats Model

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Keywords: Body weight · Golden berry · Intake · Type 2 diabetes

Background/Aims: Reduced weight gain or maybe weight loss is an indication of type 2 diabetes (T2D) in streptozotocin-nicotinamide-induced rat model. Golden berry (GB), which known has rich phenolic content, might have a potency to improve glucose uptake which results weight loss improvement. **Methods:** GB juice 5 ml/kg/d (X1) and 25 ml/kg/d (X2); and quercetin supplement 30 mg/kg/d (X3) were compared to both of positive (K+) and negative (K-) control. Treatments were given by orally gavage for 28 days to 25 Wistar rats which each group consisted of 5 rats. Intake and body weight (BW) were measured to account for the difference using ANOVA followed by LSD test and correlation using Pearson test between the groups. **Results:** During GB juice intervention, BW significantly decreased by 11.4 ± 2.5 g (p = 0.01) which synergistically decreased intake by 0.05 g in K+ (p = 0.681); while increasing BW (g) occurred in X1, X2, and X3 by 15.2 ± 3.70 (p = 0.001); 25.6 ± 2.5 (p < 0.001); and 24.8 ± 1.78 (p < 0.001) respectively which concomitantly decreased intake by 0.05 g (p = 0.177) in X1; increased intake by 1.2 g (p = 0.035) in X2 and 1.7 g (p = 0.987) in X3. **Conclusion:** There was no correlation between BW and intake of GB juice in each group. Intake of GB juice of 25 ml/kg/d presented the best effect among the treatment groups in body weight improvement.

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Development of Mobile Application for Therapeutic Nutrition Consultations

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Keywords: Personalized nutrition · Mobile nutrition system · Web based tool · Cloud technology · Medical dietetic record · Digital health application

Background/Aims: Nutrition and diet apps constitute an era of personalized nutrition care with interventions for healthy eating, weight management and services in a cost-effective way. Mobile

nutrition systems offer the means for measuring food intake and energy expenditure. They provide constant communication and interaction in the form of personalized information exchange between the interested party and a professional adviser. The present study aims to develop web based tool under cloud technology with dual platform for therapeutic nutrition prescriptions, nutrient calculations and provide first line authentic nutritional management to patients and clients, along with serving as a professional interaction media among qualified dietitians and nutritionists. Also, it would function as an electronic medical and dietetic record, and consultations can be executed even in the client's busy schedule. **Methods:** The digital health application is designed thus to provide qualitative medical nutrition therapy on a real-time basis. The methodology involves pilot study with KAP survey to gain people's choice as well as preferences on the Nutrition consultation app. Based on that, database will be created with nutritive values of different food items, common lifestyle diseases, inborn errors of metabolism etc. **Results:** The proposed mobile app would help the user to make use of on line counselling in personalized chat room with data recording facility. Such App developments encourage focusing features and characteristics valued by dietitians to guide their development of apps that support dietetic practice and enhance patient care. **Conclusion:** This study developed the online authentic nutritional interactive counselling for clients by dietitians and nutritionists.

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Nutrition and Micronutrients in Pemphigus Vulgaris of Pregnant Women

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Kewords: Pemphigus vulgaris · Pregnancy · Antioxidant · Nutrient requirement

Background/Aims: Pemphigus Vulgaris (PV) is a bullous skin disease mediated by an autoimmune response which attacks skin adhesion molecule and mucous membrane. PV during pregnancy is uncommon. The disease itself may be associated with adverse neonatal outcome including prematurity and fetal death. **Methods:** We assess an effect of nutrition and antioxidant in a 27-year-old patient who was 35th weeks of pregnancy suffering from pemphigus vulgaris. Decreased food intake for 6 months was found and there was 5 kg reduction in weight due to mouth sore. The fetus was terminated at the following week due to severe hematemesis and hypovolemic shock. Previous history revealed the same disease 8 months ago. Physical findings of the lesions included bulla, crustae, erosion and hyperpigmented macula over the skin of the head, thorax, abdomen and both extremity region. Laboratory findings include hypoalbuminemia (2.1 g/dl), anemia (7.8 g/dL), leukocytosis (13.300), hyponatremia (127 mmol/L) and thrombocytosis (625.000). The nutritional therapy given was 2500 kkal energy, protein 2 g/BW/d, carbohydrate 343.75 g, fat 77.2 g. Supplementation includes zinc, vitamin A, vitamin B1, vitamin B6, vitamin B12, vitamin C, omega 3, vitamin D and Pujimin®. **Results:** After 28 days of therapy, there was clinical improvement in the skin, mucous membrane and metabolic status, albumin (3.6 gr/dL), anemia (11.1), leukocyte (14.700), natrium (141 mmol/L) and thrombocytosis (545.000). **Conclusion:** Nutrition therapy of macronutrient and micronutrient in addition to the main medication are needed to ensure adequate nutrition, antioxidant status, improving nutritional status and immunity to further accelerate healing process, synthesis of collagen and to prevent disease remission.

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Feeding Disorders in Children with Cerebral Palsy Spastic

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Keywords: Cerebral palsy spastic · Feeding disorders

Background/Aims: Children with cerebral palsy (CP) spastic is associated with the presence of feeding disorders in almost 60% of the affected children with subsequent undernutrition reported in up to 46% of them. Oral motor dysfunction (OMD) was found in all cases of children with cerebral palsy. Feeding difficulties associated with cerebral palsy was assessed with moderate to severe oral-motor dysfunction. **Methods:** The subjects were 45 children with CP in range of ages at 5–16 years old with mix gender that conducted in YPAC (Yayasan Pendidikan Anak Cacat) Jakarta. Spastic cerebral palsy children has significantly low feeding skill score. Children with poor OMD were unable to take solid food. Data were gathered at the homes by interview and by direct observation of mealtimes. **Results:** Children with CP who have poor oral motor function took significantly longer to eat non-mashed than mashed potato. Substitutes for viscous and solid but not pureed textures could be used for children with CP. Sensorimotor therapies, oral stimulation exercises or an intra-oral appliance, will improve the range of their effectiveness. **Conclusion:** Feeding disorders have effects on nutrition status, development, health, parent-child interaction, and overall family life. Oral feeding interventions for children with cerebral palsy may be effective in improving oral motor function.

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Effects of Dietary Fiber on The Glycemic Response after Ingestion of Cooked Rice

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Keywords: Blood sugar level · Glycemic response · Cooked rice · Dietary fiber

Background/Aims: Blood sugar levels are reduced by the consumption of dietary fiber. However, the mechanisms by which this occurs for different types of dietary fiber remain unclear. In this study, the effects of dietary fiber on the glycemic response after ingestion of cooked rice were evaluated. **Methods:** Agar, glucomannan (GM), and κ-carrageenan (κ-CG) were used to form a gel and xanthan gum (XG) and guar gum (GG) were used to form a sol; these samples were used as dietary fiber. The concentrations of dietary fiber were 0–4.0% per the total rice weight. In vitro, the glucose concentration released from the cooked rice with dietary fiber was measured. In vivo, blood sugar levels were measured after the intake of cooked rice with dietary fiber. Furthermore, to determine the influence of dietary fiber on the glycemic response, the textural properties and thermal properties of these foods were measured. **Results:** The blood sugar level after ingestion of cooked rice mixed with dietary fiber was significantly lower than after ingestion of rice mixed with GM and rice mixed with XG at low concentrations. The rice mixed with the dietary fibers XG and GG suppressed increases in the blood glucose level compared to rice mixed with other dietary fibers. **Conclusion:** A strong suppressive effect of dietary fiber on the blood sugar level after ingestion of cooked rice could be achieved by covering cooked rice with sol prior to consumption.

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A Balanced-Sustainable Calorie-Restricted Diet Effect Using "Eats Up"Application on Waist Circumference and Inflammatory Marker Among Indonesian Obese Women: Randomized Clinical Trial

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Keywords: Balanced-sustainable diet application · Obesity · Tumor Necrosis Factor-α · Waist circumference

Background/Aims: The lack of compliance in dietary restriction for obesity management remains a challenge. Dietary management through mobile application can be an alternative solution to enhance the effectiveness of obesity management. This study investigated the effect of a balanced-sustainable calorie-restricted diet using "EatsUp" application for dietary management in improving waist circumference (WC) and Tumor Necrosis Factor-α (TNF-α). **Methods:** Obese women aged 19–59 years, with body mass index of ≥25.0 kg/m² and had android smartphone were randomly allocated to consume a balanced-sustainable calorie-restricted diet (intervention group, n = 28) and balanced calorie-restricted diet (control group, n = 28). They were instructed to follow recommended menu provided through the "EatsUp" application for eight weeks, weekly nutrition counseling, and sport gathering. **Results:** A balanced-sustainable diet limited the intake of red meat and dairy products but high in plant-based sources. WC and TNF-α were assessed at the baseline and end of the intervention. Baseline age, nutritional status, job, expenses and education level were comparable in both groups. After adjusted for body weight, the mean changes in WC was significantly different between the intervention and control group (adjusted mean changes –3.1 ± 4.1 versus –1.0 ± 3.6 cm, p < 0.05). However, changes in median TNF-α was not apparent between two groups [adjusted median changes –0.6 (–2.2; 0.2) versus-0.3 (–1.7; 0.2) pg/mL, p > 0.05). **Conclusion:** A balanced-sustainable calorie-restricted diet using "EatsUp" application reduced WC of obese women but unable to reduce inflammation indicated by TNF-α serum level. Promoting of a balanced-sustainable diet was needed to prevent further consequences of obesity.

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Polyunsaturated Fatty Acid Intake and Its Correlation with Positive and Negative Syndrome Scale (PANSS) in Schizophrenia Patient

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Keywords: Omega-3 · Omega-6 · Ratio of omega-6/omega-3 · Schizophre

Background/Aims: The treatment of schizophrenia is commonly viewed from a pharmacological and social perspective, but issues of nutrient intake are seldom examined. However, the various study reported that polyunsaturated fatty acids (PUFAs) concentration is reduced in the plasma of schizophrenic patients. Therefore PUFAs intake may have a correlation with psychiatric symptoms in schizophrenia patients. This study aimed to assess the PUFAs intake of schizophrenic patients and its correlation with The Positive and Negative Syndrome Scale. **Methods:** This cross-sectional study was conducted on 63 schizophrenia hospitalized patients in Ernaldi Bahar Hospital, South Sumatra, Indonesia. The psychiatric symptoms were determined using the validated Indonesian version of PANSS. Dietary intake was assessed using a 3-day food weighing. Correlation between variables was determined using the Spearman Correlation Coefficient. **Results:** The result showed a significant negative correlation between omega-3 fatty acids and Positive scale, Negative Scale, General psychopathology and risk of aggression with r = –0.345, r= –0.408, r= –0.483, and r= –0.406 respectively (p < 0.01). The omega-6 fatty acids in-

take were negatively correlated with Positive scale, Negative Scale, General psychopathology and risk of aggression with r = −0.390, r = −0.496, r = −0.525, and r = −0.389 respectively (p < 0.01). A statistically significant correlation was seen between ratio of omega-6/omega-3 and Positive scale, Negative Scale, General psychopathology and risk of aggression with r = 0.249, r = 0.256, r = 0.356, r = 0.343 respectively (p < 0.01). **Conclusion:** These findings suggest that increasing PUFAs intake might have a positive health outcome in schizophrenia patient.

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Attempt to Reduce Salt Intake of Fukushima Citizens -Efforts Using Salt Intake Check Sheet and Salt Intake Measurement

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Keywords: Salt intake · Check sheet · Fukushima citizens

Background/Aims: According to the Dietary Reference Intakes for Japanese by the Ministry of Health, Labor and Welfare, the target value of salt intake is 8 g for males and 7 g for females. However, in the National Health and Nutrition Survey of 2015, the national average was 10.8 g for males and 9.2 g for females. Furthermore, salt intake in Fukushima prefecture was 11.9 g for males and 9.9 g for females. Compared to the national average, Fukushima's value was higher. Therefore, I conducted salt awareness program and its evaluation study for Fukushima citizens to reduce salt intake. **Methods:** A prefectural citizen event was held in Fukushima City in October 2017, a survey was conducted to 93 participants using existing salt intake check sheets, and salt intake measurement's experience booth was provided to them. The salt intake check sheet is made up of 13 items of questions, the total points (35 full marks) of 13 items which show the result of evaluation of salt intake. The definition of salt intake by this check sheet is "small" at 8 or less, "normal" at 9~13, "many" more than 14. **Results:** The average point of salt intake score was 17.9 for males and 13.4 for females. Many participants said that they noticed they had taken a lot of salt.Through experiences of using salt intake check sheet and salt intake measurement, they can realize their own salt intake. The check sheet of salt intake could be used to assess diet for reducing salt intake.

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Intake and Serum Level of Vitamin D among First Trimester Pregnant Women in Karangasem District, Bali

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Keywords: Vitamin D intake · Serum vitamin D · Pregnant women

Background/Aims: Many studies in the last decade found low level of Vitamin D among pregnant women from different characteristics and different environmental background, but lack of study from Indonesia; none study on it done in Bali. This study aims to describe Vitamin D intake and serum vitamin D among pregnant women in their first trimester. **Methods:** This is a cross-sectional study involving 43 first trimester pregnant women in four primary health centers (PHC) in Karangasem district. We collected nutrient intake history with Semi Quantitative Food Frequency Questionnaire (SQFFQ) method and analyzed the data with nutrisurvey for windows software, then, comparing the result to the 2013 national required nutrient intake (AKG 2013). Meanwhile, serum vitamin D was measured 25-Hydroxy Vitamin D ELISA method. **Results:** We found median Vitamin D intake was D 1.14 μg, and mean serum vitamin D 60.1 ± 22.02 ng/mL (95% CI: 53.3–66.9 ng/mL). There was 11.6% of the pregnant women with serum vitamin D<40 ng/mL. **Conclusion:** First trimester pregnant women in Karangasem district have not fulfilled minimum required intake of vitamin D and some of them experienced Vitamin D deficiency.

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Fruit Consumption with Iron Supplement Tablet Increases The Amount of Hemoglobin in Teenage Female Dancers

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Keywords: Fruit, Iron Supplement Tablet, Hemoglobin

Background/Aims: The ideal body concept of a teenage female dancer is slender, this has an effect on their wrong diet behavior and will have an impact on the increasing iron deficiency anemia problem. This study was aimed to prove the effect of fruit consumption along with iron supplement tablet in increasing the hemoglobin level of teenage female dancers. **Methods:** The study was conducted at four dance studios at Denpasar City in 2018. The

samples were 55 female teenage with 10–15 years old, contained 28 people in the intervention group and 27 people in the control group. This type of research is experimental with the pre test-post test control group design. The intervention group was given 100 grams of fruit along with iron supplement tablet once a week for 8 weeks. The control group was given iron supplement tablet once a week for 8 weeks. Hemoglobin levels are measured by Hemocue. The mean of increased hemoglobin levels in each group was analyzed by Paired t-test and the mean difference hemoglobin levels between the intervention and control groups was analyzed by Independent t-test. **Results:** Fruit given with iron supplement tablet can significantly increased hemoglobin levels (p < 0.05). Hemoglobin levels increased from 10.89 ± 0.73 g/L to 12.63 ± 1.02 g/L. In the control group was also an increased in hemoglobin levels from 11.12 ± 0.80 g/L to 11.47 ± 0.70 g/L. The mean increased in hemoglobin levels in the intervention group was 1.74 ± 1.22 g/L greater than the control was 0.36 ± 0.19 g/L (p < 0.05).

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High Serum Hepcidin and Serum Free Hemoglobin Predict Low Skeleton Muscle Mass in Taiwanese Male

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Keywords: Hepcidin · Free hemoglobin · Skeleton muscle mass
Background/Aims: Dysregulated iron metabolism is common in population, which may impair cellular energy with further increase inactivity in obese subjects. Hepcidin impacts in iron homeostasis. We evaluated whether hepcidin and free hemoglobin is associated to body composition. **Methods:** In this cross-sectional study, we investigated 89 Taiwanese male aged 20–65 years at Taipei Medical University Hospital. **Results:** Multivariate linear regression analysis confirmed that percentage of serum hepcidin [ß = –0.016 (–0.025–0.006); p = 0.002] and free hemoglobin [ß = –0.037 (–0.057–0.017); p = 0.001] are independent predictors of skeleton muscle mass. Linear regression analysis found that serum hepcidin in the highest tertile [ß = –3.084 (–5.951–0.217); p = 0.035] had a negative predicting effect on the percentage of skeleton muscle mass. Free hemoglobin in the highest tertile [ß = –3.589 (–6.141–1.037); p = 0.006] had a negative predicting effect on the percentage of skeleton muscle mass compared with those in the middle or lowest tertile of hepcidin. These relationships were similar after adjustment for age. **Conclusion:** The percentage of muscle mass was decreased in high serum hepcidin and serum free hemoglobin.

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Nutrition Education Using Low Energy Density Menu Replica Improved the Quality Diet of Obese Adolescent

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Keywords: Obesity · Adolescents · Diet quality · Nutrition education
Background: Obesity in adolescents contributes to an increase in the prevalence of non-communicable diseases in adults or the elderly. One of the reasons is poor diet quality in adolescents. This study aims to identify the effectiveness of nutrition education using low energy density menu replica model on the diet quality of obese adolescents. **Methods:** This study used quasi experiment with control group. Sample of the treatment group was 24 obese adolescents at Senior High School Angkasa Lanud Husein Sastranegara Bandung, and 23 obese adolescents at Senior High School 9 Bandung as the control group. The effect of nutrition education using low energy density menu replica model compared to a balanced nutrition leaflet on nutrition knowledge and diet quality was identified using independent t-test analysis. Diet quality was obtained from Diet Quality Index International (DQI-I) scores. **Results:** There was significant difference in the mean changes of nutritional knowledge scores between the treatment and control groups (p < 0.05). Nutrition education using low energy density menu replica model effectively increased the mean score of diet quality significantly among obese adolescents (p < 0.05). Nutrition education using low energy density menu replica model can be part of the health program at school. Further research involving parents of the adolescents in order to achieve high quality diet can result in gradual weight loss. **Conclusion:** Nutrition education using low energy density menu replica model improved the diet quality of obese adolescents

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Early Enteral Nutrition Reduces Postoperative Ileus and Hospital Stay After Ileal Conduit Urinary Diversion Surgery: A Case Series

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Keywords: Early enteral nutrition · Bladder cancer · Ileal conduit surgery
Background/Aims: Early enteral nutrition (EEN) has widely known as a standard procedure after undergoing gastrointestinal surgery. However, many surgeons remain doubtful that EEN may reduce ileus and decrease hospital stay. **Methods:** We reported 4 males patients age 40–61 years old with bladder cancer who underwent radical cystectomy and ileal conduit urinary diversion. Patients were administered regular and liquid diet until 6-hour before anesthesia. Low dose morphine and analgetic were used to minimize ileus. EEN were administered less than 24-hour postoperative and tube feeding were released within postoperative day

(POD) 1–2. **Results:** After received low dose morphine, postoperative ileus did not occur. However, patients complaint nausea in POD 3–7 and did not tolerate with milk based liquid diet. Total hospital stay was 12–14 day, including 1–2 day of ICU stay. Before applied EEN total hospital stay was 13–22 day. **Conclusion:** EEN may reduce hospital stay without postoperative ileus, although patients experienced nausea and did not tolerate with milk liquid diet

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Assessment of Lifestyle, Food Environment and Nutrition Parameters of IT Employees for Development of a Workplace Wellness Programme

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Keywords: Workplace wellness · Employee health · Nutrition
Background/Aims: Workplace environment influences physical, mental and social well-being of workers. Turning workplaces into effective locations can improve employee health since urban employees spend one-third of the day at workplace. Information Technology-Business Process Outsourcing-the largest employment sector of India contributes to its rapid economic growth. However, the lifestyles promoted by this sector are exacerbating Non-Communicable Diseases (NCDs) among employees. Herein, we report from the formative research study that assessed the food and physical activity environment (FPAE) of the companies and nutritional status of employees to identify the opportunities and barriers of developing a workplace wellness programme (WWP). **Methods:** The study was conducted in two purposively selected IT companies of Hyderabad, India, employing a mixed-method approach combining qualitative and quantitative methods. Employees' perception about health, physical activity; scopes of developing WWP were evaluated using Focus Group Discussions (FGDs) and Non Participant Observation (NPO) were used to assess the FPAE. Structured questionnaire, anthropometry and biochemical parameters were used to evaluate the nutritional status of 67 employees. **Results:** The junior employees did not perceived themselves to be at risk of developing NCDs, while seniors had a different opinion. The FPAE varied with the size of the company. Risk factors of developing NCDs- higher BMI (53.7%), altered lipid profile (>50%), physical inactivity (50.7%), perceived stress (47%) were prevalent among employees. Stress levels were significantly associated with HDL (r = –0.31, p = 0.016) and triglyceride (Tg) (r = 0.37, p = 0.004). TG levels also correlated with physical inactivity (r = 0.31, p = 0.017). **Conclusion:** A workplace wellness programme for IT employees had nutritional health benefits. This study aided in identifying the opportunities and barriers for developing a model WWP.

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Treating Childhood Epilepsy with a MCT Ketogenic Diet: A Case Report

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Keywords: Guillain-Balre · Syndrome (GBS) · MCT (medium chain triglyceride) · KB (ketone body)
Background/Aims: This 9-year-old little girl, birth history of gestational age 38 weeks, body weight 3800 g, with history of (1) Cerebral palsy due to bacterial meningitis which can lead to Guillain-Balre´ Syndrome (GBS), (2) Epilepsy with antiepileptic drugs control. **Methods:** Due to the frequent seizure episodes, an average 3–4 seizures every day, she was suggested treatment of ketogenic diet and surveillance. The MCT (medium chain triglyceride) ketogenic diet is a special high-fat, low-carbohydrate diet that helps to control seizures in the patient with epilepsy. The MCT ketogenic diet recommends that 30 to 60 percent of the fat intake in the diet comes from MCT fats. Condition background: BH 130 cm (15–50th percentile), BW 40 kg (85–97th percentile), bed and wheelchair. Progress of treatment: When KB (ketone body)++ is induced in the body, it begins to intervene in MCT ketogenic diet, which is gradually increased from 500 kcal to 1500 kcal per day and adjusted according to the situation. **Results:** The ketogenic diet "ratio" is the ratio of fat to carbohydrate and protein grams combined and a 3:1 ration is used. Outcome: The onset of epilepsy is from 3 to 4 times a day, which is obviously reduced to 3 to 4 times a week, and the duration of action is reduced. The diet has led to significant, but not total, seizure control. Families may choose to remain on the ketogenic diet for many years in these situations.

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Dietary Quality Indices and Hepatocellular Carcinoma Prognosis: Findings from Guangdong Liver Cancer Cohort

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Keywords: Hepatocellular carcinoma · Dietary pattern · Dietary index · Survival
Background/Aims: Hepatocellular carcinoma (HCC) is one of the most common malignant tumors in worldwide. Dietary quality is associated with the occurrence and prognosis of cancers. Our earlier research has found that closer adherence to dietary guidelines for Chinese or Americans may protect against primary liver cancer. However, its role in HCC survivors is still unclear. Therefore, this study investigate the association of dietary quality based on recommended guidelines with overall and HCC specific mortal-

ity. **Methods:** This study included 887 HCC survivors who were recruited to the Guangdong Liver Cancer Cohort (GLCC) study within one month of diagnosis between September 2013 and April 2017. Detailed information on lifestyle habits and medical history were collected. Dietary quality was assessed by Chinese Eating Index (CHEI) and Healthy Eating Index (HEI)-2015. Cox propositional hazards models were used to estimate multivariable HRs and 95% confidence interval (CI) of overall mortality and HCC specific mortality. **Results:** During follow up, 316 deaths were identified, including 281 from HCC. The CHEI was inversely associated with overall mortality (HRQ4: Q1 = 0.62, 95% CI: 0.44–0.88, P-trend = 0.005) and HCC specific mortality (HRQ4: Q1 = 0.65, 95% CI:0.45–0.94, P-trend = 0.015). Higher HEI-2015 scores were only related to decreased risk of overall mortality (HRQ4: Q1 = 0.71, 95% CI: 0.51–0.98, P-trend = 0.162). **Conclusion:** Our findings suggest that higher dietary quality before diagnosis may reduce risk of mortality in hepatocellular carcinoma survivors.

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Effect of Malted-Rice Amazake on Intestinal Environment

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Keywords: Gut microbiota · Malted-rice amazake · Constipation · Isomalto-oligosaccharides
Background/Aims: Constipation is regarded as a functional disorder with a decrease in the frequency of defecation, a sense of difficulty in defecation and a feeling of aftereffect. There are two types of amazake: malted-rice amazake and Sake lees amazake. It has been reported that Sake lees amazake improves human gut microbiota and relieves constipation. But there is no report on malted-rice amazake for improving constipation. The purpose of this study is to investigate whether a long-term ingestion of malted-rice amazake will change microbiome and improve constipation. **Methods:** The subject is adult females with periodic menstrual cycles. Feces were collected in the follicular phase to minimize the influence of premenstrual syndrome. The DNA extracts from feces were analyzed using quantitative PCR using specific primers. The defecation status was investigated by self-report questionnaire. **Results:** In the defecation state, malted-rice amazake showed significant softening of the stool in hard stool group. Symptoms of constipation were improved in 83% of constipation group. Analysis of gut microbiota showed a significant decrease in Clostridium cocoides group, C. ramosum subgroup and the ratio of Firmiscutes/Bacteroidetes in constipation group due to intake of malted-rice amazake. As a result of ingredient analysis, it is possible that the malted-rice amazake we used contained isomalto-oligosaccharides, which possibly functions as a prebiotics. **Conclusion:** It was suggested that a long-term ingestion of malted-rice amazake changed the construction of gut microbiota as well as the intestinal environment, resulting in improvement in constipation.

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Nutritional Therapy in High Output Enterocutaneus Fistula with Ileum Adhesion Grade III-IV

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Keywords: ECF · Protein · Electrolyte · Micronutrient
Background/Aims: Enterocutaneus fistula (ECF) is an abnormal connection between gastrointestinal tract and skin. Loss of intestinal fluids in ECF patients lead to disruption of fluid and electrolytes imbalance along with protein loss which contribute to malnutrition. Nutritional therapy goal was to meet nutrient requirements, maintain fluid and electrolyte balance, and enhance spontaneous ECF closure. **Methods:** A 22-year-old male severe malnourished patient was diagnosed with post adhesiolysis, end colostomy surgery. His oral intake was decreased for 1 month and obtained weight loss. We found loss of subcutaneus fat, fistula at right region of abdomen and wasting on physical examination. Abnormal laboratory findings were leucocytosis, thrombocytosis, imbalance electrolyte and hypoalbuminemia. Nutritional assessment was based on mid upper arm circumference. Nutritional therapy was given with calorie target 2000 kcal, and protein 1.5 g/kg ideal body weight (IBW)/day. **Results:** On the 7th day of treatment, the patient went through relaparotomy due to high output ECF (ECF 2000 ml/d) and ileum adhesion grade 3–4. Total parenteral nutrition was given after surgery for 4 days. Protein requirements was increased to 2 g/kg IBW/day due to high output ECF and fluid requirements were adjusted with fistula output. Oral nutrition supplementation was combined between polymeric formula and whey protein, and micronutrient supplementation were given 2 times normal doses. On the 27th days of treatment, ECF output was decreased to 400 ml/d, and laboratory values were improved. **Conclusion:** Optimal nutritional therapy by maintaining adequate nutrition, fluid and electrolyte balance will improve laboratory values and decreased ECF output of ECF patient.

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Glycaemic Index of Arenga, Coconut, and Palmyra Sugars from Indonesia

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Keywords: Glycaemic index · Palm sugars
Background/Aims: Low glycaemic index (GI) food is important to determine how fast the food can raise the blood glucose. We aimed to know glycaemic index value of crystal and moulded Arenga sugar; crystal, liquid, and moulded Coconut sugar; crystal, liquid, and moulded Palmyra sugar. **Methods:** Total subjects for this study was 30 people consist of 15 males and 15 females were

purposively selected. Subjects must meet two criteria, inclusion and exclusion criteria. The procedure of GI value measurement is corresponding with Brouns et al. 2005 GI method. The GI values are determined by dividing the incremental area under test food curve with the reference food (glucose) curve. **Results:** Palm sugars (Arenga, Coconut, and Palmyra) categorized in low glycaemic index (GI) were found in crystal Arenga sugar (43.6), crystal and liquid Coconut sugar respectively (52.8 and 54.1). Moreover, Palmyra sugar types also have low GI (54.5 for crystal, 48.9 for liquid, and 49.9 for moulded). Palm sugars with medium GI consisted of crystal Arenga sugar (62.5) and moulded Coconut sugar (67.6). Furthermore, the analysis of GI also showed that there were no significant different within each type of palm sugars group (p > 0.05), except GI of crystal and moulded Arenga sugar. Glycaemic index results of Arenga, Coconut, and Palmyra sugars showed that palm sugars types have low to moderate glycaemic index value. **Conclusion:** crystal Arenga sugar with the lowest glycaemic index value among other palm sugars is the most recommendation sugar for person who wants to regulate their diet or control their blood glucose levels.

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Omega 3 Supplementation on Lipid Profile in Adolescent Obesity in Tomohon

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Keywords: Obesity · Adolescents · Lipid profile
Background/Aims: The prevalence of obesity that continues to increase and is feared is also related to blood lipid levels that can cause dyslipidemia. This study aims to determine the effect of omega 3 supplementation on lipid profiles of obese adolescents. **Methods:** The type of RCT design with a sample of 34 children of Tomohon State High School 1 who were obese. The sample was divided into 3 groups, each of which 17 samples were taken randomly, namely treatment groups 1 and 2 and the control group. All samples were carried out by early examination of triglyceride levels, HDL cholesterol and LDL cholesterol. The dose of the treatment group is 1 (one) per day 4 grams, morning 2 capsules, night 2 capsules and the group treats 2 (two) per day 6 grams, morning 3 capsules, night 3 capsules taken after meals. Time of treatment for 21 days. Data analysis with paired t-test and independent t-test (p < 0.05). **Results:** Triglycerides level decreased after given Omega 3 as much as 4 g per day from 137.9 ± 78.2 to 124.7 ± 30.3. In giving omega 3 as much as 6 g per day there was a decrease in total cholesterol from 176.5 ± 31.2 to 147.6 ± 35.3, as well as levels of HDL and triglycerides. **Conclusion:** There is an effect of giving 4 g of omega 3 per day and 6 gr per day in decreasing triglyceride levels and other lipid profiles in obese adolescents.

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Consuming Tomato Juice before Carbohydrate Ameliorates the Postprandial Glucose Levels in Healthy Women: A Randomized Controlled Cross-Over Trial

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Keywords: Postprandial glucose · Tomato · Tomato juice · Carbohydrate
Background/Aims: The purpose of this study was to evaluate the effect of consuming tomato juice before carbohydrate on postprandial glucose levels in healthy women. **Methods:** In this randomized controlled three-treatment crossover study, 25 healthy women [21.9 ± 4.2 years, BMI 20.9 ± 1.8 kg/m^2, HbA1c 33 ± 2 mmol/mol (5.3 ± 0.3%): mean ± SD] consumed either water (control), tomato, or tomato juice at 30 min before consuming 200 g of boiled rice at 9:00 for 3 separate days. The blood glucose levels were measured by self-monitoring blood glucose, at 0, 30, 60, 90, 120, and 180 min after consuming rice. The values of mean blood glucose, standard deviation of glucose (SD), the postprandial glucose, incremental glucose peak (IGP), and incremental area under the curve for glucose (IAUC) were compared among 3 days. **Results:** The values of the postprandial glucose, SD, IAUC, and IGP (tomato, 2.07 ± 0.18; tomato juice, 2.23 ± 0.19 mmol/L, vs. control, 3.59 ± 0.21, both p < 0.01) in consuming tomato or tomato juice before rice were all significantly lower than those of the control (water), while the mean blood glucose values demonstrated no difference among 3 days. **Conclusions:** Consuming tomato juice at 30 min before carbohydrate ameliorates the postprandial glucose levels equal to consuming tomato, although total amounts of energy and carbohydrate of tomato or tomato juice was higher than that of control. Drinking tomato juice before carbohydrate can be a practical method to improve postprandial glucose values in healthy women.

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Effect of Green Coffee Bean Extract on Body Weight of Wistar Strain Rats Fed with High Fat Diet

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Keywords: Body weight · Chlorogenic acid · Green coffee
Background/Aims: The prevalence of obesity is increasing worldwide as well as in Indonesia. It is a public health issue and

global epidemic. This research aims to determine the effect of green coffee extract on the weight of Wistar strain rats fed with high-fat diet. **Methods:** This research applied a true randomized experimental control design. The Wistar strain rats were grouped into 5 groups, i.e., group 1 (negative control), group 2 (positive controls fed high-fat diet), group 3 (fed high-fat diet and green coffee extract with dose of 100 mg/kg bw), group 4 (rats fed high-fat diet and green coffee bean extract with dose of 200 mg/Kg bw), group 5 (rats fed high-fat diet and green coffee extract with dose of 400 mg/kg bw). The obtained data were tested with one-way ANOVA followed by LSD analysis with $\alpha = 0.05$. **Results:** This research proves that green coffee bean extract with a dose of 100, 200 and 400 mg/kg bw can lower weight of rats fed with hight fat diet. Green coffee extract contains active compound of chlorogenic acid that can increase AMPK activity so it has positive impact that can direct the result of metabolite substance, which is useful in decreasing fat synthesis. Chlorogenic acid activates AMPK to inhibit fatty acid synthesis, and increase fatty acid oxidation. **Conclusion:** green coffee bean extract with a dose of 100–400 mg/kg lower weight of rats fed with higt fat diet.

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The Expression of Hoxa-10 Gene Among Stunted and Normal Stature Children

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Keywords: Hoxa-10 gene · Gene expression · Stunting · Normal growth

Background/Aims: Hoxa-10 gene plays key roles in embryonic development and supports bone formation has known in many research. As the consequence of its function, the expression of hoxa-10 gene among children may differ according to their growth rate. This study was addressed to answer whether the expression of Hoxa-10 gene differ among stunted and normal growth children. **Methods:** Hoxa-10 gene was obtained by DNA extraction from venous blood sample from stunted children and normal growth children. Analysis of hoxa-10 gene was carried using polymerase chain reaction (PCR) methods. Optimization analysis depicted that the target gene was found in 395 base pairs. Homologue analysis was carried on the DNA squencing to identify profile of nucleotide of the gene among children by comparing with homo sapiens Hoxa-10 antisense RNA (Hoxa-10-AS), in gene bank ID NR046609. **Results:** Base on PCR analysis, it showed that the expression of Hoxa-10 gene in blood cells was lower among stunted children compare to normal growth children. In addition, homologue analysis depicted that profile of nucleotide among stunted children has lower similarity (95.4%) with the gene bank compare to normal stature children (96%). **Conclusion:** It is indicate that the difference expression of Hoxa-10 gene between stunted and normal growth children was due to any change on nucleotide profile.

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Effect of Preconceptional Micronutrient Supplementation on Serum Concentration of Human Placental Lactogen at Last Pregnancy: A Randomized Double Blind Control Trial

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Keywords: Micronutrients · Human placental lactogen · Preconception · Vitamin A status

Background/Aims: Human placental lactogen (hPL) is a specific and most important hormone secreted during pregnancy, and its production might stimulated by several micronutrients. The study was conducted to evaluate the efficacy of micronutrients supplementation during preconception period on concentration of human placental lactogen at last pregnancy, compare to iron folic acid supplementation. **Methods:** A randomized double-blind community-based trial was conducted at East Java. Study subjects were randomly assigned into two group: MMN group received micronutrient containing 14 vitamin-minerals during preconception, continue during pregnancy, IFA group received placebo during preconception period and continue iron and folate during pregnancy. Total of 420 eligible subjects were enrolled, and 115 subjects were included final analysis. The outcome variable was serum hPL at week 35th of pregnancy. The initial status of iron, zinc and vitamin A were assessed. General linear model was used to test baseline data, independent t test was used to analyze the mean different of hPL concentration between two groups. Register trial number TCTR20150614001 was from Thai Clinical Trials Registry. **Results:** Subjects who received micronutrients supplementation during preconception period have higher hPL concentration (8.50 ± 1.90 mg/L) compared to subject who received iron folic acid (7.36 ± 2.15 mg/L) (p = 0.014). Serum retinol was also different between two group, but not iron status. **Conclusion:** Supplementation of micronutrients begin at preconception period improved concentration of human placental lactogen better than iron folic acid supplementation only during pregnancy. The improvement of hPL by 1.14 g/L might be mediated by the improvement of vitamin A status.

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Latent Tuberculosis Diet has Improved Immune Response and Nutritional Status among Infected Tuberculosis Persons

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Keywords: Diet · Latent tuberculosis · Interferon-gamma · Nutritional status

Background/Aims: Present time, prevalence of tuberculosis patients in Indonesia is still high. Probably it was conditions related to most of close-mate persons who live with tuberculosis patients. Lack of specific prevention program, causing developing of that persons suffered of tuberculosis disease. The research objective is developing a specific latent tuberculosis diet. **Methods:** First stage of the research using cross-sectional study design to assess of 36 subjects in order to develop a specific latent tuberculosis diet. Second stage is field experiment to measure the efficacious of latent tuberculosis diet on improving immune response (titer of IFN-gamma) and nutritional status (body weight, lean mass and BMI). Using randomized treatment-control trial design this intervention was carried out for 40 subjects of treatments group and 40 subjects of control group. Daily Latent tuberculosis diet is developed based on balance of energy and protein diet, with 15 mg zinc, 5.000 IU vitamin A and 2.000 IU vitamin D supplements and it's delivered for 30 days intervention. **Results:** This study showed that latent tuberculosis diet is effectively improved of immune response and nutritional status among latent tuberculosis persons (p < 0.05) and performed of treatment group better than control group (p < 0.05). **Conclusion:** Latent tuberculosis diet is the new specific diet based approach that protecting people who is infected by mycobacterium tuberculosis is still healthy.

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Is Dietary Intake Associated with Sweet Taste in Humans? A Systematic Review

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Keywords: Sweet taste · Psychophysics · Nutrition · Diet · Threshold · Intensity · Liking

Background/Aims: Dietary intake is determined by several factors and the taste of food is often cited as the primary driver of food choice and intake. Specifically, sweet taste is pleasant and some researchers have suggested that this taste may influence dietary intake. **Methods:** A systematic review was conducted to investigate the relationship between sweet taste and dietary intake reported by previous studies. A systematic literature search was conducted in the PubMed, PschInfo, Web of Science, and CINAHL databases using relevant keywords. Studies included in the final review included humans only, healthy adults aged 19 years and above, included measurements of sweet taste functions and dietary intake, and are published in English. In total, 3206 publications were identified and 17 relevant publications were included in the final systematic review. Studies were grouped according to how sweet taste was assessed in these studies namely: 1) sensitivity testing, 2) intensity testing, and 3) hedonic testing. In studies that measured sensitivity, only two out of six studies reported significant associations between sweet taste thresholds and intake, and the association was very weak in one study. In studies that measured intensity, only two out of ten studies reported associations between sweet taste intensity and dietary intake. **Results:** Studies that included hedonic testing, the liking of sweet taste was found to be associated with dietary intake in eight out of 13 studies. **Conclusion:** Hedonic measurements were superior to sensitivity and intensity measurements in predicting dietary intake.

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The Influence That Free Choice of The Eating Order Gives in The Satisfaction of The Meal

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Keywords: Satisfaction · Female athlete · Track and field · Dietary management method

Background/Aims: The much quantity of meal leads to satisfaction. It is important that an athlete who is on a diet feels full stomach after a small portion of each meal. However, any dietary management method such as getting satisfaction from a small portion of meal have not established yet. This study was intended to clarify that a dietary management method which is free regulation of food intake influences to satisfaction. **Methods:** The subjects were students athletes participated in the track-and-field jumpers (n = 17). The subjects were measured by their blood glucose level and the visual analog scale such as feeling of satisfy and satisfaction. The experimental menu was rice, salad, and deep-fried chicken. The procedure was that the experimental menu was provided twice as a free and a limited. The free trial was eating freely, and the limited trial was provided by one dish every 15 seconds. **Results:** After two minutes of the limitation trial, they were eaten freely. The level of significance was set at p < 0.05. Six subjects were on diet during the experimental. The free trial, the subjects felt satisfy before the meal. On the other hand, the limited trial was the subjects felt satisfy during the meal. Any difference between their blood glucose level and visual analog scale were found. **Conclusion:** The setting of the food providing time was too short, as a result; any influence to the meal were not found.

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Supplementation of Catfish (Clarias gariepinus) Oil Enriched With Omega-3 Softcapsule Improve Oxidative Stress and Cognitive Function in Elderly People

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Keywords: Catfish oil · Cognitive · Elderly · Malondialdehyde

Background/Aims: This study aimed to analyze the effect of supplementation catfish (Clarias gariepinus) oil enriched with omega-3 softcapsule on oxidative stress and cognitive function of elderly people. This study is part of the major study entitled "Catfish Oil as an Alternative Supplement for Prevention of Alzheimer's in the Elderly". **Methods:** This study was a single blind randomized control trial design with 29 elderly subject. The subjects who met the inclusion and exclusion criteria were randomized to determine the treatments provided. Subject were divided into three groups i.e. SO (soybean oil), CFO (commercial fish oil), and CO with omega-3 (catfish oil enriched with omega-3). The intervention was containing 1000 mg oil/ day and was administered for 90 days **Results:** There was differences in the supplementation groups which had significant effects on oxidative stress and cognitive function (p < 0.05). Supplementation of catfish oil enriched with omega-3 was able to significantly decrease malondialdehyde (MDA) level (p < 0.05). The decrease MDA levels was the highest, i.e. –0.98 μg/mL. and supplementation of catfish oil enriched with omega-3 was able to significantly increase mini mental state examination (MMSE) score (p < 0.05). **Conclusion:** The increase in MMSE score was the highest, i.e. 4.50. Overall, CO with omega-3 supplementation for 90 days was able to improve oxidative stress and cognitive function of the elderly better than other groups.

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Determination of Circadian Rhythm and Its Association with Birth Outcomes: Research Protocol of A Prospective Cohort Study

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Keywords: Circadian rhythm · Pregnancy · Birth outcome · Chrononutrition

Background/Aims: Circadian rhythm is an endogenous rhythm with a periodicity of approximately 24 hours. Disrupted circadian system has been associated with elevated risk of miscarriages, preterm birth and low birth weights. The protocol described in this paper is of a prospective study which will determine the circadian rhythm in pregnant women, identify its association with stress, physical activity and chrononutrition and will study its association with total gestational weight gain and birth outcomes. **Methods:** Sample size of 438 pregnant women in their first trimester will be randomly selected from government maternal and child clinics in Kuala Lumpur, Malaysia and then followed-up from pregnancy up to the birth of their infant. Salivary melatonin and cortisol concentration during the second and third trimester will be determined using ELISA technique in subsample of recruited pregnant women. Data on sleep quality, types of psychological distress and sleep regulation pattern of pregnant women will be collected using questionnaire. Physical activity data will be recorded for 5 days. Gestational weight gain per week will be measured and full gestational weight gain will be determined at the end of pregnancy. Utilization of food diary is to capture meal timing and nutrient intake per meal for 3 days for chrononutrition determination. **Results:** All data collected during the second trimester will also be done in third trimester. Upon giving birth, birth outcomes will be collected through clinic records and CDC Neonatal questionnaire. **Conclusion:** Outcome of this study will help to identify the role of circadian rhythm during pregnancy and subsequently, infant growth.

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Relationship Between Decreased Appetite and Depression in Patients With Chronic Kidney Disease

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Keywords: Appetite · Chronic kidney disease · Depression · Hemodialysis

Background/Aims: Depression affect appetite changes in patients with Chronic Kidney Disease (CKD). Loss appetite reduce intake of diet and patients tend to be malnourished. This study aimed to evaluate the association between decreased appetite and depression in CKD patients who conducted hemodialysis. **Methods:** Amount of 58 outpatient on Hemodialysis were evaluated for appetite used validated questionnaire and the symptoms of depression were assessed by Beck Depression Inventory (BDI). Chi-Square Test was used to analyze the relationship between decreased appetite and depression. **Results:** Patients had loss appetite were 58.6%. More than half patients were male (56.9%), 84.5% were adults (19–59 years), and 53.4% had symptoms of depression. BDI score of patients with loss appetite were higher than patients with good appetite. There was a significant relationship between appetite loss in CKD patients who carried out hemodialysis and symptoms of depression (p = 0.002). **Conclusion:** CKD patients with depression should be supported for maintaining their intake and provide good diet to prevent weight loss.

Nutrition Therapy For Stage 3 HIV-AIDS Patient With Pulmonary Tuberculosis

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Keywords: Nutrition therapy · HIV/AIDS

Background/Aims: HIV/AIDS infection is a major problem that threatens Indonesia and many other countries. Nutritional substances and supplementation are very important for patients with HIV/AIDS to help maintain condition and enhance immunity due to high risk to malnutrition and malabsorption. **Methods:** We report a case of 33-year-old with stage 3 HIV-AIDS and Pulmonary Tuberculosis, decreasing intake since ± 3 months due to odynophagia accompanied by fever and cough. The patient lost weight ±26 kg in the last 6 months. History of antiretroviral treatment for 3 years and antituberculosis treatment since 1 month, the patient's nutritional status is severe malnutrition. There is a loss of subcutaneous fat and wasting in physical examination. Laboratory finding; leucopenia (3600/μl), total lymphocyte count (TLC) (248.4/μl), hypoalbuminemia(2.5 g/dl), hypoproteinemia(5.6 g/dl), the patient has been given nutrition therapy; energy 2400 Kcal, protein 129 g, carbohydrate 330 g, fat 62.4 g, supplemented with zinc 20 mg, vitamin B complex 50 mg, vitamin C 300 mg, vitamin D 133 IU, vitamin A 5000 IU, and extract snake head fish 450 mg (Pujimin®). **Results:** After 16 days of treatment, there are improvements in the patient's clinical condition, weight gain, and metabolic status (leukocyte 4600/μl, TLC 276/μl, albumin 2.9 g/dl, total protein 6.8 g/dl.). **Conclusion:** Nutritional interventions can improve the nutritional status and immunity of the patient, thus improving the quality of life.

Association of Diet Diversity and Risk of Colorectal Cancer in Malaysia: A Multi-Centric Case Control Study

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Keywords: Diet diversity · Colorectal cancer · Malaysia

Background/Aims: The effect of diet on disease prevention is not only based on the quality or quantity, but also the diversity of the diet. High in diet diversity provides healthy and adequate nutrients which may reduce the risk of various chronic diseases including colorectal cancer (CRC). This study aims to determine the association between diet diversity and CRC. **Methods:** A multi-centric case-control study was conducted among 140 histologically confirmed CRC patients and 140 cancer-free controls in five local hospitals in Malaysia. Interviewer-administrated semi-quantitative food frequency questionnaire was used to assess the frequency and portion size of 123 items of 13 distinct food groups. Conditional Cox regression analysis was used to measure the strength of association between diet diversity and risk of CRC. **Results:** CRC risk was inversely associated with total diet diversity score (AOR = 0.7; 95% Cl 0.5–0.9) and legume (AOR = 0.46; Cl = 0.23–0.92) for the highest (more diverse diet) versus the lowest quartile) after adjusting for age, sex, ethnic, smoking status and alcohol intake. Moderately diverse (Q2) cereal and fruit consumption were inversely associated with CRC risk (AOR = 0.22, 95% Cl = 0.06–0.79 and AOR = 0.13, 95% Cl = 0.03–0.46). An inversed pattern of risk between total diversity and CRC was observed among women (AOR = 0.95, 95% CI = 0.46–0.98) subjects younger than 60 years old (AOR = 0.73, 95% CI = 0.14–0.95). **Conclusion:** Diet diversity may beneficial or detrimental to CRC prevention by promoting a healthy eating pattern that emphasizes high intake of legume and adequate intake cereals and fruits.

Dietary Folate Intake and Breast Cancer Risk in BRCA1 or BRCA2 Carriers: A Review

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Keywords: Dietary folate intake · BRCA 1 or 2 · Breast cancer risk

Background/Aims: Folate is one of the water-soluble vitamin that plays an important role in DNA methylation and regulates the genetic and epigenetic process, such as pro-carcinogenic process in the deficiency condition. While mutation of BRCA1/2 confers a high risk of breast cancer. Past studies have been studying about association between folate and breast cancer risk also brca1/2 carriers and breast cancer risk but the results are vary. This study aimed to summarize the available evidence from past studies on this issue and review of the association between dietary folate intake and breast cancer risk in BRCA1 or 2 carriers. **Methods:** We searched PubMed and BioMed databases for relevant studies, published through December, 2018. Several studies found association between dietary folate intake on the risk of breast cancer but several studies found there was no association. However, the cohort and case-control studies may have been subject t o measurement error and invalidated dietary intake assessment tools, no specific information about other folate intake, such as supplementations, and possibly missing data. **Results:** While from studies about breast cancer risk and BRCA1/2 carrier, there is a significant association between breast cancer risk and mutation of BRCA1/2. As an addition, there is no significant association between folate intake and breast cancer risk in BRCA1/2 carriers. However, it may have an association when it is compared to a wider variable such as alcohol consumption or MTHFR mutation. **Conclusion:** Potential interactions between folate intake with the risk of breast cancer on BRCA1/2 carriers deserve further investigation for better understanding.

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The Effect of HDEI-2018 Education Program Intervention on Improvement Dietary Quality, Nutrition Status and Cardiovascular Disease Risk Factors in Hemodialysis Patients

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Keywords: Hemodialysis · Cardiovascular disease (CVD) · Dietary intake · HDEI-2018

Background/Aims: Dietary prescription for hemodialysis (HD) patients is complicated and hard to implement. Poor dietary intake may cause increasing the risk of malnutrition, cardiovascular disease (CVD), other complications and worsening the health status. **Methods:** We established hemodialysis eating index-2018 (HDEI-2018) and its composed of eight components and scores from 0 to 100. We used the HDEI-2018 as an assessment tool and teaching materials to enhance HD patients' dietary implement to improve their nutrition status and health outcome. Subjects and **Methods:** We recruited 72 subjects from 1 HD center in Taiwan and divide between an intervention and a control group. Intervention group received 15 min a week nutrition education about HDEI-2018 dietary recommendations for 1 month with a booklet and information placemat. Control group subjects received regular treatment. After the intervention, all subjects followed up for 2 months. We collected subjects' age, sex, medical history, biochemical data, height and weight through medical records. We collected 3-days dietary record to calculated HDEI-2018 score, Bristol stool chart, knowledge, attitude and practice (KAP) questionnaire from subjects. **Results:** There are no characteristics and HDEI-2018 score difference at baseline between intervention and control group. **Conclusion:** After intervention, the subjects of the intervention group have higher scores of KAP and HDEI-2018 than control group after intervention. And they also improve their biochemical data which related to CVD risk factors.

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Visceral Fat Reduction Is Positively Associated with Blood Pressure Reduction in Males But Not Females Subjects with Overweight or Obesity

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Keywords: Visceral fat · Blood pressure · Obesity · Meal replacement

Background/Aims: Visceral adiposity plays a key role in hypertension, the aim of current study was to evaluate the association between visceral fat reduction and blood pressure during a meal replacement weight loss program. **Methods:** A parallel, randomized controlled trial was performed with 168 overweight/obese participants in China (ChiCTR-OOC-17012000). Body composition and blood parameters were assessed at beginning and end of the intervention. Males and females were categorized separately into quartiles according to changes in visceral fat during the intervention. Multivariate linear regression models were used to assess the relationship between changes in systolic blood pressure, diastolic blood pressure, and quartiles of change in visceral fat area, adjusted for potential confounders. **Results:** After the intervention, the average visceral fat area reduction from Q1 to Q4 was −21.48 ± 13.86, −4.71 ± 1.75, 2.12 ± 2.58, and 23.07 ± 20.29 cm^2 in males and −12.50 ± 9.34, 1.73 ± 2.26, 7.85 ± 1.72, and 19.24 ± 5.65 cm^2 in females, respectively. No significant association between visceral fat and blood pressure was found at baseline. After the intervention, significant positive associations were observed in males for systolic (β = 4.633, 95% CI: 1.505, 7.761; p = 0.005) and diastolic blood pressure (β = 3.081; 95% CI: 0.642, 5.520; p = 0.015), but not females after adjustment for the same potential confounders for systolic blood (β = −0.572, 95% CI: −3.316, 2.172; p = 0.679) and diastolic blood pressure (β = 0.265, 95% CI: −1.503, 2.033; p = 0.766). **Conclusion:** Significant reduction in visceral fat contributes to reduced blood pressure in males but not females in a 12-week meal replacement intervention.

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Comparison of Different Non-Diabetes-Specific Formulas for Glycemic Control in Critically Ill Patients

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Keywords: Blood glucose · Semi-elemental formula · Polymer formula

Background/Aims: Hyperglycemia is common in critically ill patients with unstable hemodynamic status. Sedative medication or acute illness related poor digestion may result in difficult to achieve ideal blood glucose (BG) control. Our study aimed to answer the question whether different enteral formula results in different BG stability. **Methods:** We retrospectively collected data from the medical charts. The inclusion criteria were patients with BG higher than 180 mg/dl twice received insulin infusion protocol, older than 20 years old and received mechanical ventilation. The exclusion criteria were no per os for any reason and ICU stay less than three days. The blood sugar protocol was adapted from Yale New Haven Hospital intensive insulin protocol. The formula A and B are semi-elemental formula with carbohydrate 49% and 65% respectively. The formula C and D are polymer formula with carbohydrate 45% and 52% respectively. Eighteen participants were included. **Results:** The mean(SD) age of patients was 69.0 (13.1); mean NUTRIC score and APACHE II scores were 29.6(5.2) and 6.8(1.3) respectively; BG were measured 2314 times totally and the

mean BG level was 177.6(93.5) mg/dl. In univariate analysis, the mean BG level and hyperglycemia episodes were higher in Formula B. In post hoc analysis, Formula B had the worst achieved rate of target BG level compared to other formulas. In conclusion, different enteral formula associated with different degree BG control in critically ill patients with hyperglycemia. **Conclusion:** To achieve ideal BG level, the formula with higher carbohydrate might be avoided.

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Non-Heme Iron Bioavailability and Incorporation in Young Chinese Urban Women

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Keywords: Non-heme iron · Bioavailability incorporation rate · Chinese urban women
Background/Aims: We previously reported the non-heme iron bioavailability and biological utilization from typical whole Chinese diets in young Chinese healthy urban men, this study was to further assess these values among young healthy urban women, and to check if they could be influenced by the staple food patterns in Southern and Northern China. **Methods:** Twenty-two young Chinese urban women aged 20–23 years were enrolled and randomly allocated into two groups, with rice (rice group) and steamed buns (steamed buns group) as the staple food, respectively. Each subject received 3 meals daily containing approximately 3.25 mg stable 57FeSO4 for 2 consecutive days. Besides, each subject was intravenously injected approximately 2.0 mg 58FeSO4 daily. Non-heme iron absorption and absorbed iron utilization were assayed. **Results:** Non-heme iron intake values overall, and those in the rice and buns groups were 7.2 ± 1.6, 5.9 ± 0.6, and 8.4 ± 1.2 mg, respectively; the mean 57FeSO4 absorption rates were 22.2 ± 9.6%, 22.2 ± 10.6%, and 22.2 ± 8.9%, respectively; and the mean infused 58FeSO4 utilization rates were 91.6 ± 8.2%, 93 ± 7.3%, and 90 ± 9.1%, respectively. There was no striking difference in the iron intakes and the 57FeSO4 absorption and 58FeSO4 biological utilization rates between the rice and buns groups (all P > 0.05). **Conclusion:** The data in relation to the non-heme iron bioavailability and utilization rates from representative whole Chinese diets in young Chinese healthy urban women using double-labeled stable isotope technique, was not significantly influenced by the typical staple food patterns in Southern and Northern China.

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Roasted Black Soybean Improved Vascular Function in Human

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Keywords: Vascular function · Black soybean · Nitric oxide · Polyphenol
Background/Aims: Black soybean has been used as nutrient-rich foods, and contains abundant polyphenols in its seed coat and grain. It possesses many health beneficial activities. In this study, we investigated the effect of black soybean consumption on the vascular function in healthy human. **Methods:** First trial; forty-seven female volunteers aged from 20 to 70 years old were enrolled for this study. Volunteers were asked to consume 30 g/day of roasted black soybeans for 8 weeks. Body composition, vascular function, biomarkers, polyphenol contents in urine and plasma were measured at the 4th and 8th week. Second trial; we also investigated a randomized single-blind placebocontrolled crossover trail. Participants were twenty three healthy adults aged from 30 to 60 years old. They were asked to consume 42 g test cookie containing 20 g roasted black soybean powder daily for 4 weeks. The same markers as the first trial were measured. **Results:** First trial; after ingestion of roasted black soybean, vascular age was improved and the NO level in urine was increased. Moreover, 8-hydroxy-2'-deoxyguanosine and Nε-(Hexanoyl) lysine contents in the plasma was decreased. Polyphenols were detected in the plasma and urine. Second trial; the same effect as the first trial was found. Moreover, systolic blood pressure was significantly decreased. **Conclusion:** The antioxidant ability of black soybean polyphenols could contribute to the improvement of vascular function through increasing of NO.

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Effectiveness of Giving Banana Juice on Blood Pressure Sugar Levels and Low Density Lipoprotein (LDL) in Elderly

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Keywords: Banana juice · Blood pressure · Blood sugar levels and LDL
Background/Aims: The content of potassium, soluble indestible fraction (sIF), phenols, flavonoids (cyanidin, delpinin, petudinin) and tannins in ingredients food is act as ACE inhibitors, reduce hypoglicemic activity and prevents lipid oxidation. This study aims to determine the effectiveness of giving banana juice toward blood pressure, blod sugar levels, and LDL in the elderly. **Methods:** The experimental pre-post Quasi design study in 16 elderly (8 banana juice with its peel and 8 unpeeling banana juice).

Intervention do for 7 days with 300 ml dose of banana juice given on every morning. The blood pressure data measured with sphynomanometer, blood sugar levels and LDL with Analyticon Spectrophotometer. Data analysis used t-test at 95% level confidence. **Results:** After seven days of treatment get significant reduction of blood pressure on unpeeling banana juice (systolic diastolic mean is 21.37, 21.50 mm Hg) (p = 0.02 and p = 0.04), blood sugar level 39.12 mg/dl(p = 0.19) and LDL 5.37 mg/dl (p = 0.58), whereas the banana juice with its peel group (systolic diastolic mean is 31.00 and 10.37 mm Hg (p = 0.00 and p = 0.00), blood sugar levels 4.87 mg/dl and LDL 31.87 mg/dl (p = 0.59 and p = 0.09). **Conclusion:** There is an effect of giving peeling and unpeeling banana juice to blood pressure, but not significant blood sugar levels and LDL. Education needs to increase fruits consumption for prevent degenerative diseases on elderly.

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N-3 Polyunsaturated Fatty Acids Intake and Dyslipidemia in Renal Transplant Recipients

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Keywords: n-3 fatty acids · EPA · ALA · Lipid profiles · Renal transplant

Background/Aims: Dyslipidemia, which is one of cardiovascular disease (CVD) risk factors to cause death after renal transplantation, is most prevalent in renal transplant recipients (RTRs). The study has investigated that the n-3 polyunsaturated fatty acids (PUFAs) may improve the CVD in RTRs. But, it has been found that eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) was protective, whereasα-linolenic acid (ALA) was not. However, EPA, DHA and ALA are n-3 PUFAs, there are different effects on protecting CVD. We aimed to investigate the associations between intake of n-3 PUFAs and lipid profiles in RTRs. **Methods:** The study is a cross-sectional study, which was recruited 90 RTRs. Basic data and lipid profiles with chart review were collected. Dietary intake was assessed using three-day dietary records and analyzed with Cofit pro. **Results:** N-3 PUFAs, EPA, DHA and ALA intake were 3.4 ± 1.7 g/day, 0.2 ± 0.3 g/day, 0.4 ± 0.5 g/day, and 2.6 ± 1.3 g/day, respectively. In adjusted for gender, age and calories analyses, the n-3 PUFAs intake was significantly associated with higher plasma high-density lipoprotein cholesterol (HDL-C) levels (β = 0.0174). ALA intake was significantly associated with higher total cholesterol (TC) levels (β = 0.0046). **Conclusion:** The n-3 PUFAs intake was significantly positively associated with HDL-C. ALA intake may increase TC levels in RTRs. In the future, we will study effect of EPA, DHA and ALA on protecting cardiovascular disease in renal transplant recipients.

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Malnutrition Risk and Its Association With Body Weight Status, Appetite and Energy Adequacy Among Hospitalised Elderly Patients in A Public Hospital in Malaysia

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Keywords: Malnutrition risk · MUST · Energy adequacy · Appetite

Background/Aims: Malnutrition is prevalent in hospitalised patients especially among older adults and established linked with higher morbidity and mortality rates. However, screening on malnutrition risk at earlier stage was not well practiced in clinical settings. **Methods:** This cross sectional study aimed to determine the malnutrition risk and its association with body weight status, appetite and energy adequacy among elderly patients admitted to a public hospital in Selangor, Malaysia. The malnutrition risk was assessed using the Malnutrition Universal Screening Tool (MUST), weight and height were measured and body mass index (BMI) was computed to indicate the body weight status. Appetites of the subjects were assessed using Simplified Nutritional Appetite Questionnaire (SNAQ). 24-hour dietary recall was used to assess the dietary intakes and energy adequacy defined as intake of ≥ 80% from requirements. **Results:** Of 133 patients, 57.9% were males with mean age of 69.90 ± 7.53 years (age ranged 60–94) were recruited. More than half of the subjects (58.8%) were at medium and high risk of malnutrition. One-third of the subjects (31.6%) were overweight, 14.3% were obese and 9.8% were underweight. Patients with medium and high risk of malnutrition were more likely to be in older age group, lower BMI, low appetite score and high energy inadequacy. Malnutrition is a prevailing issue in clinical practice and often underrecognized. **Conclusion:** Nutrition screening should be part of comprehensive strategies in early malnutrition detection and management.

Poster Presentation

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Fat Intake and Dietary Fiber Intake Associated with Central Obesity among Adults in the Girimaya Health Center, Pangkalpinang

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Keywords: Central obesity · Fat intake · Dietary fiber intake

Background/Aims: According to the National Health Survey (Riskesdas) 2013 there are 18 provinces of Indonesia have prevalence of central obesity above the national average, and one of

them is Bangka Belitung province. Central obesity caused by changes in lifestyle such as high consumption of energy dense foods, low consumption of vegetables and fruit, as well as lack of physical activity. This study aimed at analysing association between fat intake, fiber intake and central obesity in Pangkal Pinang, Bangka Belitung. **Methods:** This crossectional study was done in Girimaya Primary Health Center (PHC) of Pangkal Pinang, Bangka Belitung. The subjects of this study were 158 adults aged 18–55 years that recorded in the monitoring report of Girimaya PHC and fullfill the inclusion criteria for the study. In this study data was collected from secondary data and primary data. The primary data collected include body weight, body height, waist circumference, and food intake. The fat intake and fibre intake were calculated based on the food intake data and food composition tables. Data analysis is done gradually by univariate, bivariate (Kendall tau correlation test) and multivariate (logistic regression analysis). **Results:** The results showed that fat intake had a positive association with central obesity among adults in Girimaya PHC with correlation coefficient of 0.744. Dietary fiber intake had a negative association with central obesity among adults in Girimaya PHC with correlation coefficient of –0.370. **Conclusion:** Fat intake and dietary fibre intake associated with central obesity in Girimaya PHC of Pangkal Pinang, Bangka Belitung Province, Indonesia.

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Correlation between Fat Intake, Sodium Intake and Systolic Blood Pressure of Gymnastics Participants of Indonesian Heart Foundation

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Keywords: Blood pressure · Fat intake · Gymnastics participant · Hypertension

Background/Aims: According to Ministry of Health report, prevalence of hypertension is currently increasing in Indonesia. In DKI Jakarta, a capital city of Indonesia, 20 percent of adult population are suffering from hypertension. Several factors that cause hypertension, which are unchangeable factors and changeable factors. Changeable factors include physical activity, fat intake, sodium intake, nutritional status, alcoholic beverages intake, and stress. The objective of this research was to analyse the correlation between fat intake, sodium intake, and systolic blood pressure in cardiac gymnastics participants. **Methods:** This research used a quantitative method with cross sectional design. Research participants were selected by using purposive sampling. As many as 30 adult subjects from gymnastics participants of Indonesian Heart Foundation were selected for this study. Data collected include food intake during the last two weeks, and blood pressure. Fat intake and sodium intake was calculated based on food intake and food composition tables. **Results:** The results using Pearson correlation analysis showed that there was a significant correlation between fat intake and systolic blood pressure (p = 0.030), but there was no correlation between sodium intake and systolic blood pressure (p = 0.512). **Conclusion:** In this study fat intake positively correlated with systolic blood pressure.

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Handgrip Strength and Its Association with Sociodemographic Profiles and Body Weight Status of Patients in Medical Wards

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Keywords: Handgrip strength · Muscle status · Body weight · Clinical

Background/Aims: Handgrip strength using dynamometry has been widely used in hospital settings as a valid marker of overall health and muscle strength. Low handgrip strength is considered a better predictor of clinical outcomes than low muscle mass when it is measured in standard conditions and compared with reference populations. This crosssectional study aimed to determine the handgrip strength and its association with sociodemographic profiles and body weight status among adult patients in medical wards of a public hospital in Selangor, Malaysia. **Methods:** A total of 265 who met the inclusion criteria were recruited. Handgrip strength was measured in both right and left hand using the handgrip dynamometer. Sociodemographic profiles were accessed from the medical record. Body weight and height were measured and body mass index (BMI) was calculated. **Results:** The mean age was 53.4 ± 16.01 SD, with males more than females 51.6% vs 48.4%, respectively. The prevalence of underweight were 13.4% and 51.2% were overweight and obese. Older patients tend to have lower handgrip strength (14.23 ± 9.61 SD) as compared to younger patients (rs = –0.174, p = 0.006), and a higher BMI was significantly associated with higher handgrip strength (rs = 0.134, p = 0.036). **Conclusion:** Handgrip strength significantly correlates with body weight status, future studies can be done to investigate further on the underlying reasons that might affect the handgrip strength status in patients in medical wards.

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Scurvy and Nutritional Rickets in a Marasmic Toddler with Leg Pain

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Keywords: Scurvy · Nutritional rickets · Child nutritional disorder · Nutritional deficiency

Background/Aims: Scurvy is caused by prolonged severe dietary of vitamin C. As it is rare compared to other nutritional disorders, it is scarcely suspected, so the diagnosis is frequently overdue. Other disorder that can be found is nutritional rickets, which is caused by vitamin D deficiency. This case study was intended to reveal the nutritional management for improvement nutrition and helath of children with scurvy and nutritional rickets. **Methods:** A 3-year-old marasmic boy with pale and severe pain in leg with difficulty in walking for 3 months. He had anorexia, irritable, without

bleeding manifestation and his dietary fruit and vegetable was very insufficient. There was rachitic rosary, wasting, swelling at both of knee and did not look hyperemic. Laboratory test showed anemia, normal PT an APTT, low vitamin D serum level, and hypocalcemia. Knee X-ray revealed scurvy appearance and pelvic X-ray revealed osteoporosis appearance. He was administered vitamin C, calcitriol, calcium, and marasmus protocol, introduce fresh fruit and vegetable to his diet, and intensify UV exposure. **Results:** After two months treatment, there was significant improvement in symptoms and general health, increased vitamin D serum, calcium serum, and hemoglobin level, improvement in radiology. This case emphasizes the role of comprehensive history-taking in the recognition of classic deficiency diseases. Although it is still rare to find scurvy and nutritional rickets in the developing countries, they are need to be considered in diagnosis, especially when managing patients with specific dietary requirements or restrictions. **Conclusion:** A careful assessment and intervention of nutrition for children with scurvy and nutritional rickets could improve his nutrition and health status.

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Nutritional Therapy In Chronic Inflammatory Demyelinating Polyneuropathy: Case Report

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Keywords: CIDP · Malnutrition · Functional capacity · Nutritional therapy

Background/Aims: Chronic inflammatory demyelinating polyneuropathy (CIDP) is an acquired, immune-mediated disorder characterized by progressive symptoms of weakness and sensory deficits which can lead to significant neurological disability with estimated prevalence 1–2 per 100.000 adults. Neurological disability makes the patients physically unable to obtain or prepare food, leading to malnutrition and worsening health status. **Methods:** A female patient, 48 years old with progressive symptoms of weakness and sensory deficit for the last 9 months. Body weight decreased 37% (29 kg) dan hairloss. Nutrient intake during illness 18 kcal/kgBW, protein 0.7 g/kgBW, fat 35% and carbohydrate 48%, and at the beginning of therapy 31 kcal/kgBW, protein 1.3 g/kgBW, fat 36% and carbohydrate 47%. Laboratory results anemia (10.6 g/dL), thrombocytosis (686.000/μL) and hypoalbuminemia (2.57 g/dL). Nutritional therapy given 35 kcal/kgBW, protein 1.3 g/kgBW, fat 29%, carbohydrate 56% as a balanced diet with supplementation of vitamin B complex, vitamin C, folic acid and vitamin D3. After 20 days of nutritional therapy and 5 times of plasmapheresis in hospital, symptom of weakness and sensory deficit decrease, body weight increase from 49 to 50 kg. Home visit was made for nutritional education and therapy. At the third home visit, body weight increase up to 51.4 kg, hair loss decrease and patient was trained to walk. **Conclusion:** Optimal nutritional therapy for CIDP patient may increase functional capacity and reduce malnutrition.

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Factors Associated with Food Choice Values among Hemodialysis Elderly in Selected Dialysis Centres, Malaysia

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Keywords: Food choice · Hemodialysis · Elderly · Nutritional status

Background/Aims: Food that people choose to consume has important implications for their health. Debilitating chronic medical conditions linked with ageing may alter patients' food selection of their current diseased condition. Thus, this study aimed to determine factors associated with Food Choice Values (FCVs) among Hemodialysis (HD) elderly in selected dialysis centres. **Methods:** A cross-sectional study was conducted among 119 subjects in nine HD centres. Socio-demographic data, dietary intake, malnutrition risk (DMS), depression (PHQ-9), Health-related quality of life (HRQOL) (KDQOL-36) and FCVs were assessed via interview sessions whilst medical profile was collected from subjects' medical record. Anthropometric measurements were also completed. Data were analysed using the IBM SPSS version 21.0 and statistical significance was set at $p < 0.05$. **Results:** Majority of subjects had normal body mass index (46.2%), inadequate energy and protein intake (91.6%), moderately malnourish (71.4%), non-depressed (84%) and perceived better HRQOL in terms of symptoms (73.37 ± 17.01) and effects of kidney disease (72.63 ± 19.74). Safety, sensory appeal and organic factors were the strongest endorsement of FCVs. There was a significant negative correlation between age ($p < 0.05$), energy intake ($p < 0.05$), protein intake ($p < 0.01$) and fat intake ($p < 0.01$) with total FCVs score. The prediction model suggests that age and fat intake were the contributors to FCVs. **Conclusion:** Safety, sensory appeal and organic foods were determinant factors of FCVs among HD elderly. This study was undertaken as a first step towards the exploration of evidenced-based food choice motives by first gathering an understanding of FCVs that are held by HD elderly. This interest could be taken into account when designing and implementing nutritional intervention or health promotional activities targeting HD elderly.

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Effectiveness of Providing Snack Bar Based on Fermented Black Glutinous Rice on Fasting Blood Sugar Levels in Subjects with Impaired Glucose Metabolism

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Keywords: Snack bar based on fermented black glutinous rice · Fasting blood sugar levels · Disorders of glucose metabolism

Consumption of fiber and anthocyanin helps reduce fasting blood sugar levels in pre diabetic patients. Snack Bar Based on Fermented Black Glutinous Rice is one of cereals with antioxidants, bioactive compounds, and fiber. The aim of the study was to determine antioxidant activity, glycemic index and effectiveness of giving Snack Bar Based on Fermented Black Glutinous Rice on fasting blood sugar levels in patients with impaired glucose metabolism. **Methods:** An experimental research design was applied into two groups consisted 30 adult females (30– 50 yrs) each. The subjects were 60 adult women reside in Kidang Pananjung Village, Cililin District, West Bandung. The study was conducted for 30 days. The intervention group was daily given a snack bar (30 g) made from fermented black glutinous rice (FBGR) and a low calorie diet education. The control group was given a low-calorie diet education only. **Results:** The results showed that the mean decrease in blood glucose levels after treatment in the treatment group was 18.67 mg/dL and in the control group 8.37, There were significant differences in reducing blood glucose levels between the treatment and control groups (p < 0.05). **Conclusion:** Consuming 30 g snack bar of FBGR for a month with a low calorie diet education reduce fasting blood sugar levels in subjects with impaired glucose metabolism.

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Development and Evaluation of Malaysian Nutrition Environment Survey (MNES) on Adolescents' Body Weight Status in Two Urban Environments – Study Protocol

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Keywords: Obesity · Adolescence · Food environment · Perception · Store and eateries audit

Background/Aims: Given the rapid urbanization, frequency of eating out and convenience food purchasing has increased among Malaysians, contributing to poor eating behaviour and rising prevalence of childhood obesity. Culturally-specific food nutrition environment survey instruments are necessary to better understand the influence of built environment and individuals' perceptions of their nutrition environments on obesity. We developed three Malaysian Nutrition Environment Survey (MNES) instruments i.e. MNES-Eat, MNES-Store and MNES-Perceive to assess perception of food environment and factors contributing to food choices, including availability of healthy foods, facilitators and barriers to healthful eating, pricing, food quality and signage/promotion of healthy and unhealthy foods in eateries and stores. **Methods:** This research involved the following steps: (1) development and conceptual model of items of the surveys; (2) expert review; (3) pilot testing and revising the surveys; and (4) administration of the surveys, where two neighbourhood sites with contrasting density of eateries and stores were identified using the GIS (Geoinformation Systems) and Google Map. Eateries and stores within 1-km radius of the selected neighbourhoods were evaluated. The scope of food environment surveyed includes common eateries i.e. Western fast foods, "Mamak" stalls, food courts- and food purchase venues i.e. large and small convenience stores frequented by Malaysians. **Results:** Body weight, dietary intake and food environment perception of adolescents (n = 800), aged 13–16 years attending schools in the two selected neighbourhoods were obtained. Data was verified for test–retest reliability and assessed for validity by comparing the food environments of the neighbourhoods to adolescents' weight.

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Problems in Introducing the Carb Counting Method to Patients with Type 1 Diabetes – Dieticians and Patients Opinions

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Keywords: Carbo Counting method · Dieticians

Background/Aims: This study explored the reasons for preventing the introduction of the Carbo Counting method from the standpoint of a dieticians and patients who participated in the seminar. **Methods:** For this purpose, a questionnaire survey for those who participated in the Carbo Counting seminar held from 2017 to 2018 was applied. Dieticians and patients who participated in this seminar were 74 and 171 people respectively. **Results:** As a dieticians, a good point is that "the range of things that can be eaten is spread", "the patient's blood glucose stabilization has increased", "the patient himself has become able to regulate insulin on the ground", and a bad point is that "There is no understanding of physicians", "There are many elderly patients", "There are few opportunities to study or learn." In the patients, there are opinions such as "increased degrees of freedom of meal", "I understood the amount of insulin to be struck", "get better my blood glucose after meals", "get a job with confidence" There were opinions such as "I was not advised", "I did not do a car count at a hospital", "Calculation is troublesome", "My insulin/carbolic ratio is unknown", "It is difficult to determine carbohydrate content". From each standpoint, the problem which can not be introduced became clear. **Conclusion:** As there are patients who need a carbo counting, it is necessity of developing an environment where dieticians can study.

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Development of Culturally Modified Food Exchange List for Myanmar Nutritionists and Myanmar NCDs Patients

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Keywords: Culturally-modified · Myanmar · Nutritionists
Background/Aims: This research aimed to develop culturally modified food exchange list (FEL) to be used in nutrition counseling, especially for diabetic and weight management, because to date, FEL of the local foods is non-existent in Myanmar. **Methods:** This was an action research and the 2008 American Dietetic Association's FEL was the initial starting point. To make culturally sensitive FEL, foods that were inconsistent with Myanmar culture were removed after precise reviewing the original list, market research and experts' suggestions. Then the interviews were conducted 25 diabetic and/or obese or overweight patients to know most common foods consumed by this target population. **Results:** The foods resulting from the interviews and suggestions from the experts were added to the list. The foods removed were fast foods, combination foods and other 158 items. The 47 food items were added and therefore final list had 315 food items under the 9 food groups. Then the required nutrient values of the added foods were calculated according to the food groups. The nutrient information for 100 grams of foods was obtained from Asian and Myanmar Food Composition Tables. After calculating one exchange serving for each food, this amount in grams was expressed by using household utensils. Although it is developed based on secondary data, the developed list is believed to be useful, at least in the present time. This research was done by many steps, and had weaknesses and limitations. **Conclusion:** Culturally modified food exchange list for myanmar nutritionists and Myanmar NCDs patients was developed.

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Dietary Diversity in Cambodian Women and Children in A Cluster Randomized Control Trial of Enhanced Homestead Food Production with and Without Gender Components

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Keywords: Dietary diversity · Food production · Gender components
Background/Aims: To determine baseline levels of household food security, dietary diversity, food production, and income among participants in an Enhanced Homestead Food Production (EHFP) program in Cambodia. **Methods:** We initiated a randomized control trial of 156 clusters, consisting of a village model farm and ten farmers (n = 1560) in 2017. Clusters were randomly assigned to: (i) EHFP, (ii) EHFP plus gender, and (iii) Control. The baseline collected information on minimum dietary diversity for women (MDD-W), minimum acceptable diet for children (MAD), the Women's Empowerment in Agriculture Index (pro-WEAI), WASH, and nutrition practices. **Results:** The average MDD-W at baseline was 4.38 ± 2.09, with approximately half of participants consuming five or more food groups in the previous day (49.3%, n = 748). Average MDD-W was similar across all arms. The mean dietary diversity score for children 6–23 months was 3.78 ± 1.38, with over half of these children consuming four or more food groups (57.7%, n = 316). Two-thirds (67.6%) of women participated in staple grain farming and post-harvest processing in the last year. Of those, 46.2% had input into decisions regarding this activity. Across all arms, 32% of women participated in decisions on large household expenditures, and 25% of women had support for childcare. **Conclusions:** Although women provide major contributions to agriculture production, they have limited control over decisions about what to produce and what to purchase. Dietary diversity in Cambodia is low among both women and children. By the end of the project, we expect to see significant improvements in women's empowerment within the women-centered approach.

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Knee Height-Based Study of Body Height on Elderly in Bareng Village, Malang

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Keywords: Body height · Knee height · Elderly
Background/Aims: To measure body height of elderly subjects to assess their body mass index can be a problem if they can not stand straight. Some suggest the knee height can be used to estimate body height. The purpose of this research is to get suitable formula to estimate body height based on knee height for elderly in Indonesia. **Methods:** This research was conducted in Bareng Village, District of Klojen, Malang City, from August to November 2017, by applying an observational study with a cross sectional design. The population was the elderly who live in Bareng Village. Purposive sampling technique was used select 120 elderly subjects, which consisted of 60 females and 60 males. Data was analyzed using Kolmogorov Smirnov test and linear regression test was using paired t-test to compare the difference between real body height and the body height calculated using the formula. **Results:** The mean age of subjects were 67.8 years old, with the mean body weight, body height and knee height was 57.7 kg and 153.1 cm and 48.3 cm respectively. From all alternative formulas to estimate body height based on knee height, the formula by Food and Nutrition Research Institute was closely describes Indonesians elderly' body height. It can be seen from the statistic test which showed that its result was not significant, which means that it is similar to the result of body height measurement. **Conclusion:** The formula to estimate elderly body height based on body knight were Body height = 35.98 + 2.45x knee height (for male), and Body height = 38.93 + 2.32x knee height (for female). Further research with minimum samples of 600 elderly for each sex group is needed to develop a better formula of body height estimation based on knee height.

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Effect Tempe Gembus on High-Sensitivity C-Reactive Protein (hs CRP) and Adiponectine Levels in Metabolic Syndrome Rats

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Keywords: Tempe gembus · H · Adiponectin · Metabolic Syndrome

Background/Aims: Metabolic syndrome can be suffered by 1 in 5 healthy people in the world. Metabolic syndrome can affect the inflammatory state which increase hs CRP and decrease adiponectin levels. Tempe gembus is one of the functional food can reduce the risk of metabolic syndrome through the inflammatory pathway. The aim this study to analyze the effect of tempe gembus on hs CRP and adiponectin levels in metabolic syndrome rats. **Methods:** The quasi experimental study, post test only control group design on 30 Sprague Dawley rats divided into 2 control groups (K- and K +) and 3 treatment groups (P1, P2, P3) were given 4-week tempe for 2.5 g, 5 g, and 7.5 g. hs CRP and adiponectin levels measured by ELISA. Statistical analysis using one way anova test and Kruskal Wallis. **Results:** Tempe gembus given as 2.5 g, 5 g and 7.5 g statistically can reduce the hs CRP levels (p = 0.037) and increase adiponectin levels in metabolic syndrome rats (p = 0.008). The dose 2.5 g of tempe gembus was the most affect on hs CRP levels and the dose 5 g tempe gembus was the most affect on adiponectin levels. **Conclusion:** Tempe gembus significantly can increase adiponectin levels and reduce CRP levels.

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Meta-Analysis of the Effects of Glutamine on Postoperative Complications, Immune Function and Nutritional Status of Colorectal Cancer

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Keywords: Glutamine – Colorectal cancer – Postoperative complications – Nutritional status – Immune function

Objective: To explore the effect of perioperative glutamine supplementation on postoperative complications, nutritional status and immune function of colorectal cancer. **Methods:** All randomized controlled trials that met the inclusion criteria from the default time to October 2018 were retrieved from the following databases: Pubmed, Medline, Embase, Cochrane Library, Chinese biomedical literature database (CBM), Chinese journal full text database (CNKI), and Wanfang database. Meta-analysis was performed on the included studies after screening. **Results:** A total of 24 articles were included, including 1,466 patients. Meta-analysis indicated perioperative supplement glutamine can prevent anastomotic fistula, shorten the length of hospital stay, adjust the immune function related indicators such as IgG, IgM, IgA, CD4, CD4/CD8, up-regulate nutrition-related biochemical indicators such as albumin, prealbumin and reduce the level of serum inflammatory factor TNF-α. However, There were also no significant differences between the two groups on postoperative incision infection and pulmonary infection complications. **Conclusion:** Glutamine supplementation during the perioperative period of colorectal cancer plays a certain role in preventing anastomotic fistula, improving postoperative immune function and shortening hospitalization time, but there is insufficient evidence for preventing infectious complications and improving nutritional status.

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Nutritional Status and Food-Services Satisfaction of Korean Elderly Patients with Stroke in Rehabilitation Hospital

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Keywords: Nutritional status · Food-services satisfaction · Stroke · Elderly

Background/Aims: The purpose of this study is to investigate the nutritional status and food-services satisfaction of the Korean elderly patients with stroke (KEPS) in the rehabilitation hospital. **Methods:** This study was conducted on 100 KEPS in a rehabilitation hospital in Incheon, Korea from June to August, 2018. All data were collected using one-to-one interview with questionnaires, and analyzed using SPSS 21.0 program. In particular, their nutritional status was assessed using the elderly nutrition index (ENI) developed by Korean Nutrition Society and 24-hour recall method (analyzed by CAN pro 5.0). More than half of the subjects were over 70 years old, and compared with cerebral hemorrhage more subjects were suffered from cerebral infarction. The average score of ENI was 33.4 points which was very lower than criteria score (62 points) of the Korean Nutrition Society. In addition, all items of ENI such as balance and diversity were judged to be medium and low grade, so nutritional management is necessary focused on them. **Results:** The average energy intake of the subjects was 1,863 kcal which was a good level compared to Dietary Reference Intakes for Korean, but they had less intakes of vitamin D, calcium, potassium and magnesium. Satisfaction with hospital meals was higher in male elderly (p < 0.05), and the frequency of leaving food was higher in the female elderly because amount of food was too much (p < 0.05). These results showed that it is necessary to provide meals of high quality supplemented with deficient nutrients to improve unbalanced nutritional status for KEPS. **Conclusion:** Korean elderly patients with stroke satisfied with the meals at their rehabilitation hospital.

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Job Satisfaction and Job Performance for Nutrition Management of Dietitian in Geriatric Hospitals at Some Areas of Korea

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Keywords: Job satisfaction · Job performance · Geriatric hospital · Dietitian

Background/Aims: The number of geriatric hospitals (GH) which were required professional nutrition management by dietitian is increasing in Korea. The purpose of this study is to investigate the job satisfaction (JS) and job performance (JP) of dietitian in GH. **Methods:** This study was conducted on 135 dietitians in GH at Seoul, Gyeonggi, and Incheon, Korea from June to August, 2018. All data were surveyed and scored by self-recording method and analyzed using the SPSS 21.0 program. **Results:** More than half of the subjects were female over 30 years old (59.3%), and worked in GH for more than one year (71.9%). They managed nutrition for more than 100 patients (88.9%), and worked with another dietitians (94.1%). The average total scores for JS and JP of the subjects were 3.4 out of 5 points, and 23.5 out of 35 points, respectively. In particular, the score of the welfare item related to performance assessment and pay was the lowest (3.0 points) among scores of JS, and the average total score of JS was significantly higher in over 40 years old and in above head of team (p < 0.05). The score of item such as 'Providing nutrition education for patient or guardian' was lowest among scores of JP. These results showed a significantly positive correlation between JS and JP of the subjects, and the higher level of JS, higher was the JP (p < 0.001). **Conclusion:** Most senior nutritionists satisfied with their job in geriatric hospitals of Korea. The lowest job performance of nutritionists especially in the aspect of nutrition education; which need to be improved.

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Effects of Omega-3 Polyunsaturated Fatty Acids on Glucolipid Metabolism and Lipoprotein Subtractions in Type 2 Diabetic Patients

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Keywords: ω-3 polyunsaturated fatty acid · Type 2 diabetes mellitus · Glucolipid metabolism · Lipoprotein subfraction

Background/Aims: The study aimed to determine the effects of ω-3 polyunsaturated fatty acids coming from different sources on glucolipid metabolism and lipoprotein in type 2 diabetic (T2DM) patients with dyslipidemia. **Methods:** Subjects for this study were recruited from the diabetes clinic at the Guanlin hospital in Yixing city, Jiangsu province from February 2017 to March 2017. subjects were randomly assigned to 3 g/d fish oil, 3 g/d perilla oil, or 3 g/d fish oil mixed with linseed oil for 3 months. Serum glucose, triglyceride, total cholesterol, high density lipoprotein, low density lipoprotein cholesterol were determined at baseline and after 3 months of intervention. Low-density and high-density lipoprotein were analyzed by Lipoprint System. 156 subjects completed the final follow-up after 3 months. **Results:** Triglyceride and total cholesterol in three groups were significantly lower than that at the baseline (p < 0.05). Compared with other two groups, triglyceride in fish oil groups significantly decreased (p < 0.05) after 3 months. There was a trend for HDL to increase after fish oil supplementation (p = 0.055). The large HDLs in fish oil group were significant higher than those in other groups; the small HDLs in perilla oil group were lower than others and the LDL subfractions in three groups had no significant difference. Lipids effect of animal-derived ω-3 PUFA inT2DM patients with dyslipidemia shows an advantage over plant-derived ω-3 PUFA and animal mixed with plant-derived ω-3 PUFA. **Conclusion:** The effects of ω-3 PUFA coming from different sources on glucose metabolism in T2DM patients with dyslipidemia are similar.

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Effects of Boiling on Phosphorus Content and Palatability of Meats

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Keywords: Phosphorus · Phosphorus to protein ratio · Boiling · Palatability

Background/Aims: Hyperphosphatemia leads to increasing risk of cardiovascular events and death in patient with dialysis. Dietary phosphorus restriction and intake adequate amount of protein play a prominent role in control of hyperphosphatemia and in preventing of protein-energy malnutrition for dialysis patients. Previous studies revealed that boiling of meats allows for a reduction of the phosphorus content while preserving protein content. The aim of this study was to search the effective boiling condition which could decrease phosphorus and to assess the effect on the palatability of beef. **Methods:** The retention of phosphorus, protein and phosphorus to protein ratio in beef before and after boiling was assessed. Various size of the beef (block and sliced) and different cooking time were applied. The level of hardness, delicious taste, juiciness, and overall sensory judgment of beef were evaluated. **Results:** The value of phosphorus and phosphorus to protein ratio of the sliced beef samples decreased in a boiling time dependent manner. The phosphorus content of the sliced beef sample which boiled 1 minute was almost equal the content of the block beef sample which boiled 30 minute. The value of delicious taste and overall judgment decreased in a boiling time dependent manner. **Conclusion:** This study shows that by slicing of beef and boiling for a short time is possible to efficiently reduce phosphorus while retaining the protein and palatability.

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Cost Analysis of Food Waste in the 3rd Class Hospital Ward in Bogor

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Keywords: Cost · Food waste · Patients

Background/Aims: The food waste, the food did not consumed by patients, in hospital may cause loss of economy cost. It causes the cost expenditure in food service to be inefficient. The aim of the study was to analyse the food waste cost by inpatients of 3rd class hospital ward in Bogor. **Methods:** The study design was a case study with 49 sample during the 10- days cycle menu. characteristic data of patients were collected by interview using questionnaire, and the food waste of sample was obtained by weighing and recall. **Results:** The average of patient's food waste was 27%, with the average daily cost was Rp 11.281 per person per day or 25% of the unit cost. There was a significant correlation (p < 0.05) between the breakfast schedule, food preference in the form of aroma at breakfast, and while food preference in the form of color, texture, and aroma at lunch with food waste. The results showed that there was no significant correlation (p > 0.05) between internal factors in the form of physical condition, as well as external factors in the form of meal and food schedule from outside the hospital. In addition, the hospital food organoleptic at breakfast in the form of color, texture, taste and portion, lunch in the form of taste and portion, while dinner in the form of color, texture, aroma, taste, and portion. **Conclusion:** In this study the loss of cost from food waste was 25%; and the main reasons of the food waste in hospital was food preference.

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In Vitro and In Vivo Anti-Diabetic Effects of Acidic Polysaccharides Extracted from Seaweeds

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Keywords: Acidic polysaccharide · Seaweed · Molecular weight · Anti-diabetic effect

Background/Aims: The objective of this study was to assess the á-glucosidase inhibitory activity of acidic polysaccharides extracted from seaweeds in vitro, and investigated their anti-diabetic effects in type 2 diabetes model KK-Ay mice. **Methods:** á-glucosidase inhibitory activity of acidic polysaccharides extracted from 11 species (brown, red, and green algae) were compared. The acidic polysaccharides were hydrolyzed into different molecular weights. Male KK-Ay mice were divided into high fat-high sucrose diet (control) group and low-molecular-weight acidic polysaccharide from hijiki (LMAPH) diet group. The mice were provided each diet for 3 weeks. The body weight and fasting blood glucose levels were measured once every week. HbA1c was measured in the final week. Acidic polysaccharides extracted from brown algae tended to show higher á-glucosidase inhibition than those from red and green algae. **Results:** Among acidic polysaccharides from brown algae, there were some that show higher inhibition in the high molecular weight range (>240,000 Da) and others that show higher inhibition in the low molecular weight range (<40,000 Da). LMAPH showed a higher inhibitory activity. There were no differences in body weight, but the fasting blood glucose levels of the LMAPH group were significantly lower than those of the control group. The HbA1c level of the LMAPH group was significantly lower than that of the control group. **Conclusion:** á-glucosidase inhibitory activity differed among acidic polysaccharides from different seaweed species, and each have an optimum molecular weight. The administration of LMAPH reduced carbohydrate metabolism in the gastrointestinal tract, leading to reduction in hyperglycemia in KK-Ay mice.

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Could Rosella Tea Reduce Body Weight Without Improving Lifestyle?

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Keywords: Rosella tea · Body weight · Overweight women · Food intake · Sedentary behaviour

Background/Aims: Rosella tea is a herbal tea that contain anthocyanins. It is expected to have anti-obesity effect. Overweight women are expected to reduce their weight through consuming herbal tea without improving their lifestyle. This study evaluates the effect of rosella tea on reducing body weight among overweight women. **Methods:** This is quasi experimental design with control and treatment group. Respondents are overweight women aged 30–60 years. Control and treatment group consists of twelve and eleven respondents respectively. Treatment group consumed ± 250 ml rosella tea twice a day for 14 days. The subjects were instructed not to change their lifestyle during this study. **Results:** After 14 days, the body weight of both groups decreased from 63.5 ± 10.35 kg to 63.35 ± 10.33 kg (treatment group) and from 64.65 ± 9.54 kg to 64.65 ± 9.99 kg (control group). However there were not statistically significant (p > 0.05). There are no significant differences both in food intake and sedentary behavior of both groups between the initial and the end of study, except fiber intake on control grup. **Conclusion:** Body weight of overweight women who consumed rosella tea for 14 days could not reduce without any lifestyle improvement (food intake and sedentary behavior).

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Individualized Nutrition Counselling in Childhood Obesity Management: Is It Effective?

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Keywords: Childhood obesity · Counseling · Dietary intake

Background/Aims: As Obesity in childhood can track into adult years and result in serious metabolic complications, effective obesity interventions are crucial. This study assessed the effectiveness of a stage-based lifestyle modification intervention for obese children. **Methods:** A total of 50 obese children (7–11 years old) were randomized to the intervention group (IG, n = 25) or the control group (CG, n = 25). IG received developed Nutrition Practice Guideline for the Management of Childhood Obesity for six months and CG received a standard treatment for the management of childhood obesity. Data on demographic, socioeconomic and medical history were collected at baseline, while complete assessment on anthropometry measurement, dietary intake and physical activity (Physical Activity Questionnaire for Older Children) were performed every month. Changes in body composition, physical activity and dietary intake were examined in both groups. **Results:** At the end of the intervention, weight was increased lesser in the IG (1.5 ± 0.5 kg) compared to CG (3.9 ± 0.6 kg), (p = 0.04).Body Mass Index-for-age z scores decreased significantly in IG (− 0.2 ± 0.0, p < 0.01) but not in CG. The physical activity of the IG significantly increased (0.44 ± 0.13) compared with that of CG (− 0.28 ± 0.18), and the difference in mean change between groups was statistically significant (p < 0.05). Dietary intake was not significantly different between the two groups. However, calorie and carbohydrate intake decreased significantly in both groups. **Conclusion:** A nutrition counselling implemented through a stage-based intervention that modified dietary and physical activity behaviour may be effective in weight management for obese children.

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Functional Status by Fat-Free Mass Index among Elderly with Chronic Obstructive Pulmonary Disease in Respiratory Clinics, Malaysia

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Keywords: COPD · Elderly · FFMI · Functional status · Dietetics

Background/Aims: Nutritional abnormalities were common among Chronic Obstructive Pulmonary Disease (COPD) patients and it was found to be correlated with functional status. However, most of the studies were reported among adults population with limited data on the elderly population. This study was conducted to determine the functional status of elderly with COPD at respiratory clinics and compared it with Fat-Free Mass Index (FFMI). **Methods:** A cross-sectional study involved 140 of elderly diagnosed with COPD was conducted at Respiratory Clinic of Institut Perubatan Respiratori and Hospital Serdang. Functional status was assessed using both handgrip strength and Medical Modified Research Council (MMRC), which used to determine patient's breathlessness on daily activities. The greater grade of MMRC indicated incapability. TANITA InnerScan Body Composition BC-541 was used to assess FFMI. Patients were considered having a depletion of FFMI if they had FFMI ≤16 kg/m^2 for male and ≤15 kg/m^2 for female. **Results:** Majority of them had normal FFMI (78%), and the rest experienced depletion of FFMI (22%). This study found that patients in Grade 3 of MMRC had lower FFMI compared to patients in Grade 0 of MMRC (p < 0.05). Patients with low FFMI had lower handgrip strength compared to the group with normal FFMI, however, no significant difference was found between these two groups. Low FFMI was related to the patient's functional status. **Conclusion:** This indicates the need for nutrition intervention by the dietitian for COPD patients, in order to improve their overall health status.

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Comparison of Nutritional Status by Severity of the Disease among Elderly with Chronic Obstructive Pulmonary Disease

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Keywords: COPD · Elderly · Severity · Nutritional status

Background/Aims: Poor nutritional status was commonly reported in COPD patients and it was found to be correlated with the severity of the disease. However, the data on the elderly population was limited. This study was conducted to determine the nutritional status of elderly patients with COPD and compared with the severity of the disease. Method: A cross-sectional study was conducted at the Respiratory Clinic of Institut Perubatan Respiratori and Hospital Serdang, Malaysia among 105 elderly patients diagnosed with COPD. Nutritional status was assessed using anthropometric measurement which involved Body Mass Index (BMI), Fat-Free Mass Index (FFMI) and body fat. Weight loss for the past 6 months was recorded based on the patient's medical record. Severity of the disease was determined by Forced Expiratory Volume1 (FEV1) value which classified as following, mild: FEV1 ≥ 80%; moderate: 50% ≤ FEV1 < 80%; severe: 30% ≤ FEV1 < 50%; very severe: FEV1 < 30% predicted. **Results:** High proportion of the patients in this study fell into moderate stage (55%), followed by severe (34%) and mild stage (12%). This study found that patients in severe stage had lower BMI and FFMI compared to others ($p < 0.05$). Besides that, the majority of patients in the severe and moderate stage were presented with weight loss, however, no significant difference was found. COPD elderly patients in severe stage had poor nutritional status compared to others. **Conclusion:** The need for in-depth nutrition risk assessment in COPD patients by dietitians in primary care.

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Total Parenteral Nutrition Successfully Treating Dysphagia, Caused by Esophageal Motility Disorder: A Case Report

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Keywords: Total parenteral nutrition (TPN) · Enteral nutrition (EN) · Gastroesophageal reflux disease (GERD)

Background/Aims: Esophageal motility disorders encompass dysphagia and include: achalasia; spastic esophageal motility disorder; and secondary esophageal motility disorders related to scleroderma, diabetes mellitus, and gastroesophageal reflux disease (GERD). The purpose of our study was to evaluate the benefits and importance of venous support in patients with GERD during surgery. **Methods:** This 72 years old male patient with medical history of dysphagia (caused by esophageal motility disorder), this time, he suffered from progressive dyspnea on exertion. He also complain of progressive dysphagia, easy choking and difficult of swallowing. Due to difficulty in feeding, weight loss, and pre-operative esophageal myomectomy, total parenteral nutrition (TPN) support is used. condition background of patient: BH 163 cm, BW 42 kg, BMI 15.8 kg/m^2. Daily average caloric intake 500–900 kcal, and protein intake 20–35 g. The goal energy is 1800 kcal/day and protein is 70 g/day. Progress of treatment: TPN provides 1800 calories per day and 75 grams of protein before surgery. Try enteral nutrition (EN) on the third day after surgery, the TPN and EN were combined for 4 days. **Results:** When the EN intake achieved 70% TEE (total energy expenditure), the TPN was successfully separated. 100% TEE after 3 days of total enteral nutrition used. Outcome: Weight increased from 43 kg to 48 kg, GCS (Glasgow Coma Scale) improved from 10 to 11, APACHE II (Acute Physiology and Chronic Health Evaluation) score improved from 12 to 11, Pre-albumin improved from 12.2 to 16, and Hb (Hemoglobin) improved from 9.9 to 13.6. TPN promote an effective service to patients. **Conclusion:** In this case, total parenteral nutrition Successfully treating dysphagia, caused by esophageal motility disorder.

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Using Health Literacy to Enhance the Effectiveness of Dialysis Patients in Identifying Potassium Content in Fruits

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Keywords: Chronic kidney disease · Hemodialysis · Potassium · Fruit

Background/Aims: Fruits in Taiwan are rich all year round, and it is quite convenient to take fruit. For patients with chronic kidney disease and hemodialysis who need a low potassium diet and how to choose low-potassium fruits is often troublesome. In this study, the fruits of the four seasons of Taiwan are photographed and made into posters, making it easier for patients to understand the potassium content of fruits. **Methods:** 30 hemodialysis patients were engaged in this study.The potassium content of winter fruits in this season was classified and made into posters to test the cognitive differences before and after the education intervention. Statistical analysis was performed by the McNemar test and represented statistically significant with a p-value <0.001. **Results:** The results have shown that the cognition of the potassium content of fruits of the post test were better than the previous testand reached a statistically significant difference ($p < 0.001$). It is good for patients to understand the potassium content in a serving of fruit by using health literacy posters. According to the individual needs, you can choose the right amount of fruit to achieve the

goal of normal blood potassium. To confirm the effectiveness, further research will be conducted to analyze the changes in blood potassium levels of patients after intervention in the future.

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The Associated of Different Sorts of Dietary Fibers and Glycemic Load in Dietary with the Risk of Gestational Diabetes Mellitus during the Second Trimester in a Cohort of Chinese Pregnant Women

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Keywords: Dietary fibers · Glycemic load · Gestational diabetes mellitus
Background/Aims: The study aimed to investigate the relationships of the intake of different sorts of dietary fibers (DF) (from grains, beans, fruits or vegetables) and total dietary glycemic load (GL) to the incidence of gestational diabetes mellitus (GDM). **Methods:** In this case-control study, Chinese pregnant women with and without GDM were enrolled in a prospective cohort study in 4 hospitals from May 20, 2016 to December 31, 2017. 85 GDM case subjects and 768 control subjects with normal glucose tolerance (NGT) were selected in the cohort. A dietary survey (24-hour dietary recall on 3 consecutive days) was used to evaluate the intakes of energy, protein, fat, carbohydrate, different sorts dietary fibers (such as grains, beans, fruits and vegetables) and GL at 16 weeks' gestation (WG) and 24 WG, respectively. **Results:** The maternal age, pregravidic weight and BMI in GDM women were significantly higher than those in NGT women. The proportion of high-risk pregnancy in GDM women is significantly higher than that in NGT women. Higher intakes of energy and GL at both 16 WG and 24 WG increased the risk of GDM after adjustment for maternal age, pregravidic weight and BMI. On the contrary, higher intakes of dietary fat and total DF at the 16 WG decreased the risk of GDM. Similar results were also be found in dietary protein and fruit DF at the 24 WG. **Conclusion:** Lower intakes of DF, especially fruit DF, and higher GL in the median diet during the second-trimester pregnancy might increase the risk of GDM.

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Effect of Whole-Course Nutrition Management on Patients with Esophageal Cancer Undergoing Concurrent Chemoradiotherapy: A Randomized Control Trial

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Keywords: Esophageal cancer, Concurrent chemoradiotherapy, Full nutrition

Objective: The purpose of this study was to investigate the effect of full nutrition management on the prognosis and complications of patients with esophageal cancer through a randomized controlled trial. **Methods:** A total of 96 patients with esophageal cancer concurrent chemoradiation were randomized to observation group (treated whole-nutrition management by the Nutrition Support Group (NST)) and control group (general nutritional supprt) for 6 weeks approximately. **Results:** A total of 85 subjects completed the study (observation group = 45, control group = 40). There were significantly different in the changes in serum albumin, prealbumin, and total protein between two groups throughout the trial (P < 0.05). Radioactive esophagitis, skin symptom of the complications, the roles, emotional functions, social functions, and general health status in the quality of life were statistically different before and after the intervention (P < 0.05). The difference in the change of other indicators was not statistically significant. **Conclusions:** Whole-course nutrition management can improve the nutritional status of patients with concurrent chemoradiotherapy of esophageal cancer, reduce the severity of radiation esophagitis and radiation skin reactions, improve the quality of life and relieve their depressive symptoms.

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Higher Muscle Mass Percentage is Associated with Lower Visceral Fat Rating in Overweight and Obese Women in Jakarta

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Keywords: Visceral fat · Muscle mass · Overweight · Women
Background/Aims: High visceral fat level is known to be an independent risk factor for cardiovascular and metabolic diseases among women with overweight/obesity. Increasing muscle mass has been recommended to improve visceral fat levels. However, the extent of the relationship between muscle mass and visceral fat has not been studied in Jakarta. Our objective is conducting a cross-sectional pilot study as a part of the ongoing obesity management in urban population project. **Methods:** Forty-seven women with overweight/obesity were recruited during community outreach of Sumber Waras Hospital, Jakarta, in 2017. Height, weight, upper arm circumference (UAC), as well as visceral fat rating and muscle mass percentage by bioelectrical impedance analysis (Tanita SC-330) were measured. Linear regression analysis was performed with Stata version 15. **Results:** Participants median BMI was 27.5 kg/m^2 (IQR = 25.1–31.0 kg/m^2), with median age of 46 years (IQR = 39–56 years). Increase of muscle mass percentage by 5% related to a reduction of visceral fat rating by 1.49 (95% CI = 1.10–1.88). After entering age and UAC variables in the model, the relationship become slightly stronger, with reduction of visceral fat rating by 1.82 (95%CI = 1.60–2.04). Adjusted R-squared of final model was 0.93. We found further evidence to support increasing muscle mass of women with overweight/obesity, as this might lead to reductions of visceral fat levels. This study also highlights the importance of body composition measurements in determination

of muscle mass and visceral fat. **Conclusion:** We acknowledge the limitation of this cross-sectional study; and suggest prospective trials that tracks muscle mass and visceral fat levels be conducted in the future.

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Relationship between Lifestyle and Residence Style in Japanese Female University Martial Arts Players

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Keywords: Martial arts · University student · Food related lifestyle · Residence style

Background/Aims: Some of the female university students' have played martial arts in Japanese. The martial arts players follow courtesy and special rules in their life. Therefore; it is seems like the martial arts players' lifestyle is orderly. From the previous articles, Japanese female university students' lifestyle and residence style have related. However, there is not any previous research for martial arts players' lifestyle and residence style. The purpose of this study was decided to the relationship between lifestyle and residence style in Japanese female university martial arts players. **Methods:** The participants were university students who play martial arts (n = 557). The subjects answered the survey about their "residence style" and "lifestyle". One of the group was the athletes who lives with their parents and the other group was the athletes lived in dormitory or living by oneself. The statistical difference was determined by a chi-square test. **Results:** The number of people who living with their parents ate breakfast for 4–6 days a week (88.4%), which was significantly higher (p < 0.01) than the students who lived in dormitory or living by oneself (78.4%). One the other hand, the subjects who live in dormitory or by oneself cooked 4–6 days a week (40.4%) which was significantly higher (P < 0.001) than another group (9.4%). **Conclusion:** Residence style in Japanese female university martial arts players associated with food related lifestyle.

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Managing Dyslipidemia among Urban Adults in Delhi: Mindful Eating, Lifestyle Changes vs Consumption of Any Specific Oil

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Keywords: Dyslipidemia · Mindful eating · Lifestyle change · Canola oil

Background/Aims: Cardiovascular disease is on the rise in the Indian subcontinent and efforts to control the risk factors like dyslipidemia, should be priority. This study was conducted to verify the beneficial effects of consuming canola oil vs. other commonly consumed oil(s) in managing dyslipidemia. **Methods:** Eighty urban affluent dyslipidemic adults (40 experimental, 40 control) aged 30–45 ears from private hospitals were enrolled for a one month run-in and four month intervention. Diet and lifestyle advice for lipid lowering was provided to both groups.In addition Experimental group was provided canola oil for consumption. BMI, waist circumference (WC), LDL, HDL, Total Cholesterol (TC) and Triglycerides (TG) were assessed at pre and post-intervention; post run-in stage. Self-report checklist measured monthly compliance. Mixed effect linear regression and quantile linear mixed models were used to analyze the change over time. **Results:** There was no significant difference between the compliance of both the groups towards dietary and lifestyle advice (p = 0.525, 0.795). There was a significant reduction in weight (2.68%, p < 0.001), BMI (2.33%, p < 0.001), WC (3.85%, p < 0.001), LDL (10.83%, p < 0.001), TC (9.01%, p < 0.001) and TG (12.01%, p < 0.001) of the experimental group. In the control group, a significant reduction in weight (3.69%, p < 0.001), BMI (5.21%, p < 0.001), WC (5.49%, p = 0.001), LDL (13.56%, p < 0.001), TC (10.3%, p < 0.001) and TG (7.55%, p = 0.029) were observed. HDL did not change significantly. The difference of changes between the groups was not statistically significant. **Conclusion:** Mindful eating and lifestyle changes play a key role in management of dyslipidemia by beneficially altering the anthropometric and lipid parameters rather than simply relying on consumption of certain specific edible oil(s).

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Does The Taste and Appearance of Food Affect The Food Waste in Low-Salt Diet Patients?

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Keywords: Taste of food · Appearance of food · Low-salt diet · Food waste

Background/Aims: Large of the food waste can be one indicator of nutritional deficiencies in patients. This lack of nutrition is a factor that can increase morbidity, length of day and cost of care. The acceptance of the taste of food in patients with low-salt diets is often a problem, so in this study wanted to prove the effect of taste and appearance of food on food waste in patients with low-salt diets. **Methods:** This study uses a cross-sectional design with observational methods. The data obtained from filling out the questionnaire. The study was conducted at the Jasa Kartini (JK) Hospital, Tasikmalaya and the time of the study in August-October 2017. The samples were selected by purposive sampling in accordance with the specified inclusion and exclusion criteria, namely patients with low-salt in patient care with 30 respondents. **Results:** The acceptance of the taste and appearance of food from JK Hospital according to the respondents, the value was quite varied, generally above the median value on a scale of 1–3. The average of food waste from patients with low-salt diets at JK Hospital was still above the PGRS (Nutritional Guideline for Hospital) standard 2013, which was 26%. Based on the analysis between variables,

there was a significant relationship between food waste and food taste (p = 0.002) and food waste and food appearance (p = 0.000) in low-salt diets patients. **Conclusion:** The taste and appearance of food significantly affect the food waste in low-salt diet patients.

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Food Preference among Cancer Patients in National Cancer Institute, Putrajaya, Malaysia

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Keywords: Food preferences · Cancer patients · Knowledge · Attitude

Background/Aims: The food preferences are the key components to alleviate malnutrition problem. Thus, this cross-sectional study aimed to determine the relationships of socio-demographic characteristics, anthropometric data, knowledge and attitude with food preferences among cancer patients in the National Cancer Institute, Putrajaya. **Methods:** A total of 163 cancer patients participated in this study. Socio-demographic characteristic was obtained from the interview session. For anthropometric measurements, weight and height were measured by the researcher. Knowledge and attitude were assessed using cancer awareness questionnaire while food preferences were assessed using a self-structured food preferences questionnaire. More than half of the subjects were Malay (59.5%) and (49.7%) were diagnosed at stage 4 with a mean age of 52.6 ± 12.9 years. The mean Body Mass Index was 24.4 ± 5.6 kg/m^2. **Results:** Majority of them had poor knowledge (57.7%) and attitude level (85.3%). Majority of the subjects preferred fruits (96.3%) to be served in the hospital while fat and oil (41.1%) were disliked the most. A significant association was found between knowledge and food preferences of fruits (p = 0.039). Knowledge was the significant factors that would affect food preferences. **Conclusion:** Health care professionals have to frequently provide nutritional advice to educate the cancer patients. A standardized menu cycle according to the preferred food items should be provided to reduce the food wastage problem and also may increase patients' dietary intake.

Track 2: Early Life Nutrition

Oral Presentation

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Intercorrelation among Topic-Based Nutritional Knowledge, Attitude, and Practice of Adolescent School Girls

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Keywords: Adolescent school girls · Healthy lifestyle · KAP · Topic-based

Background/Aims: Even though it is understandable that nutritional knowledge is correlated with attitude and practice among adolescent girls, due to limited time and resources in conducting nutrition education, teachers/educators should choose specific topics and contents to deliver to make learning more effective. This study aimed to assess and correlate nutritional knowledge, attitude, and practice (KAP) on specific topics among adolescent school girls. **Methods:** A cross-sectional study was conducted in July 2017 involving 387 adolescent girls from Junior High Schools and Vocational High Schools in Bogor. A self-administered questionnaire covering 6 topics (breakfast, fruit and vegetables, physical activity (PA), smoking, healthy snacks, and food diversity) was filled by the subjects at school. The correlations among KAP were analyzed using Spearman's Rank test. **Results:** Although most (79.8%) of the respondents agreed that drinking a glass of tea is not considered as breakfast, almost all (92.8%) had poor knowledge that milk could replace a complete meal for breakfast, and even most (77.8%) of them did not regularly have breakfast. Even though almost all (97.2%) of the respondents liked fruit and vegetables and most (65.9%) of them knew the relationship between lack of fruit and vegetables consumption with adulthood obese, only 3.4% of them used their allowances to buy fruit. Most (73.4%) of the subjects agreed to have PA, but they had poor knowledge (26.1%) and practice (5.9%) on the recommended frequency and duration. **Conclusions:** This study suggested topic-based improvement of KAP for adolescent girls in order to prevent misunderstanding and to motivate them to implement healthy lifestyle.

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Associations between Feeding Practices and Child Diet Quality and The Potential Influence of Child Eating Behaviours on These Associations

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Keywords: Feeding practices · Diet quality · Child eating behaviours

Background/Aims: Parents' feeding practices influence children's food intake. Little is known about how children's eating behaviours (fussiness, enjoyment of food, food responsiveness, satiety responsiveness) influence these associations. This study examined associations between feeding practices and pre-school children's diet quality and whether children's eating behaviours influence these relationships. **Methods:** In 2018, 1400 Australian mothers of children aged 2–5 years completed an online survey including validated measures of feeding practices (n = 9), child eating behaviours (n = 4), and diet quality. Fourteen items were summed as a measure of diet quality; higher scores indicate better quality. Linear regression assessed associations between feeding practices and diet quality, including interactions between feeding practices and child eating behaviours. **Results:** The feeding practices positively associated with diet quality were structured meal timing, monitoring, covert restriction, modelling healthy eating, and structured meal setting (coefficients: 0.64 to 2.68). The feeding practices negatively associated with diet quality were overt restriction, persuasive feeding, reward for eating, and reward for behaviour (coefficients: −0.91 to −1.84). Child eating behaviours moderated associations between two feeding practices and diet quality. Modelling was associated with diet quality for children with low satiety responsiveness, but not children with high satiety responsiveness. Monitoring was associated with diet quality for children with high food responsiveness, but not children with low food responsiveness. Some associations between feeding practices and child diet quality appear to be moderated by children's eating behaviours. **Conclusions:** Nutrition promotion programs may need to be tailored for parents with different feeding practices and children with differing eating behaviours.

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Education on Balanced Diet Recommendation to Improve Mother's Compliance in Better Diet and Nutrient Intake for Stunted Children in Surabaya, Indonesia

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Keywords: Stunted children · Education · Balanced diet recommendation

Background/Aims: Stunting is a condition of low height for age in children that indicates a linear growth failure as an impact of chronic malnutrition.There has been no education approach using specific balanced diet recommendation (BDR) for stunted children in Indonesia, especially in Surabaya. The purpose of this study was to analyze mother's compliance in giving better diet and energy, protein, Fe, and zinc intake for stunted children after getting 3 months education on BDR. **Methods:** The study was conducted with one group quasy experimental study with pre- and post-test. A total of 150 stunted children were involved, selected from 36 primary health centers around Surabaya.The BDR was prepared specific for stunting children, which was derived from Optifood Linear Programming. Education on BDR was provided 3 times within 3 months by trained supervised nutritionists. Mother's compliance was assessed using Semi Quantitative Food Frequency A questionnaire and 2x24 h food recall were used to measure nutrient intake. Height was measured with microtoise. The data were analyzed using paired t-test. **Results:** There was improvement in mothers' compliance in giving better diet and nutrition to their stunted children.The mean of compliance increased from 8.3 to 10.4 (p = 0.00) and intake of all nutrients increased significantly (p = 0.000). **Conclusions:** Education on locally specific BDR for stunting is an important approach to improve the health and nutrition status of stunted children.

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Association of Maternal Vitamin D Status and Fetal Anthropometric Measurements: A Cohort Prospective Study In West Sumatra, Indonesia

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Keywords: Pregnancy · 25-hydroxyvitamin D · Newborn anthropometry · West Sumatra

Background/Aims: Prevalence of vitamin D deficiency (VDD) appears to be increasing. VDD during pregnancy has been associated with several adverse pregnancy outcomes. This study aimed to investigate the association between VDD and fetal anthropometric measurement. This prospective cohort study consisted of 239 pregnant women in their first trimester who were recruited in antenatal clinics and they maintained to be subjects of the study until their delivery time. Serum 25-hydroxyvitamin D [25(OH)D] level was measured at first and third trimester using enzyme-linked immunosorbent assay. Maternal vitamin D status was reported as <20 ng/mL and normal vitamin D (NVD) was defined as ≥20 ng/mL. **Results:** The prevalence of VDD in the first-trimester was 82.8% while 17.2% of the subjects were classified as having NVD. Mean serum 25(OH)D in the third-trimester was significantly higher than that of the first trimester (21.21 vs. 14 ng/mL). After adjusting to age, body mass index (BMI), and gestational age at delivery, it was found that deficiencies, either at first or third-trimester, of maternal serum 25(OH)D levels were not significantly associated with newborn anthropometry (p > 0.5). Vitamin D level during pregnancy was found to be increasing. **Conclusions:**

These findings strengthened the evidence that deficient vitamin D status was common in tropical countries region and it needed to be taken into account to improve maternal health. Large, well-designed, multicentre observational studies are required to determine whether deficient vitamin D status enhances the risk of adverse pregnancy outcomes.

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History of Breastfeeding in Stunting Children Aged 0–24 Months in Tualang Village Tualang District, Siak Regency, Riau Province

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Keywords: Infants · 0–24 months · Stunting · History of breastfeeding · Formula milk

Background/Aims: The purpose of this study was to determine the history of breastfeeding among stunting children aged 0–24 months in Tualang village, Tualang district, Siak regency, Riau province. **Methods:** A cross-sectional study was conducted from October 2016 to March 2017. Subjects in this study were total population of stunting children aged 0–24 months in the area (n = 17). Data were collected using a questionnaire. All subjects were still breastfeeding (100%) during data collection. **Results:** Almost all mothers of the subjects were stay-at-home mothers (94.1%) and 70.6% of the fathers were laborers. As many as 82.4% of subjects were breastfed more than eight times a day with 88.2% of them breastfed for only 5–7 min in each breastfeeding time. As many as 70% of subjects were breastfed by their mothers from both the left and right breasts. A total of 76.5% of subjects were started to be given complementary food when they were less than 6 months old. Approximately 41.1% of the mothers started breastfeeding 30–60 min after birth. A total of 47.1% of the mothers were motivated to breastfeed. All subjects were also fed with formula milk (100%). **Conclusions:** Breastfeeding practices among stunting children aged 0–24 months from non-working mothers and labor-working fathers need serious attention regarding early breastfeeding initiation and formula feeding. Mothers should be given motivation to initiate early breastfeeding and improve breastfeeding practices.

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Correlation of Birth Weight and Birth Length, Nutrient Intake and Mother's Height with Stunting among Children At Sukmajaya District Depok

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Keywords: Birth length and weight · Mother's height · Nutrient intake · Stunting

Background/Aims: Stunting among children under five years old in Indonesia still needs serious attention. In 2013, there were 37.2% stunting children under five years old inIndonesia. Stunting has negative effect on mental development, especially in children under five. The objective of this study was to determine the relationship between birth weight, birth length, energy intake, protein intake, and mother's height with stunting at the working area of Sukmajaya Integrated Health Service, Depok. **Methods:** This study used crosssectional study. The subjects were toddlers aged 24–59 months, with a total of 68 toddlers (34 female and 34 male). The subjects were obtained by cluster random sampling. Weight and height were measured and the subjects' mothers were interviewed with a questionnaire and food recall. **Results:** A total of 29.4% of the subjects were stunting and 70.6% of them were categorized as having normal nutrition status. Statistics analysis showed that birth weight (p = 0.010), birth length (p = 0.032), energy intake (p = 0.032), and protein intake (p = 0.010) had significant associations with child stunting. There was no relation between mother's height (p = 0.383) with stunting. **Conclusions:** Several factors had significant association with stunting, thus they need to be taken into account in efforts to alleviate stunting in the future.

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Early Initiation of Breastfeeding among Primiparous Women in Port Moresby General Hospital, Papua New Guinea

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Keywords: Early initiation of breastfeeding · Primiparous women · Papua New Guinea · Parental education

Background/Aims: Early initiation of breastfeeding (EIBF), or breastfeeding within one hour of birth, promotes newborn survival and breastfeeding establishment. This cross sectional study aimed to find the proportion of primiparous women who practiced EIBF with their newborns, and whether delayed breastfeeding initiation was associated with pre- or post-lacteal feedings. **Methods:** Throughout June 2018, 148 mothers were interviewed soon after delivery in Port Moresby's tertiary referral hospital. Chi-

square and t-tests were used to perform the comparison tests. **Results:** The prevalence of EIBF was 76% (n = 113). However, only 107 (72.3%) mothers were reported giving breast milk as their first and only early feedings in the ward. Unfortunately, 26 (17.6%) gave cow's milk (infant formula) feedings both before and after their initial breast milk feeding, while seven (4.7%) gave infant formula only as pre-lacteal feed and eight (5.4%) others provided formula feeding soon after their initial breastfeeding. Chi-square tests showed EIBF was associated with the condition where the infants did not receive any pre- or post-lacteal formula (p < 0.001) feeding. Moreover, t-tests showed that mean years of education of both mothers (10.3 + 2.9 y vs. 7.8 + 4.2 y; p = 0.013) and fathers (11.6 + 2.3 y vs. 9.8 + 4.2 y; p = 0.015) were significantly positively associated with the practice of feeding formula to their infants after, but not before, the first breastfeeding session. **Conclusions:** Although 72% of primiparous mothers practiced EIBF and EIBF was associated with the practice of not giving any other food or drink before or after the first breastfeeding session, several mothers who had higher level of education were more likely to request and give infant formula soon after, but not before, their newborn's first breastfeeding session. Provision of infant formula for early infant feedings in hospitals need to be reconsidered.

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Development of Nutrition and Health Education Module for Pregnant Women to Improve Maternal Nutrients Intake Quality and Birth Outcomes

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Keywords: Nutrition and health module · Knowledge · Pregnancy

Background/Aims: Knowledge regarding nutrition and health during pregnancy is important for improving nutrient intake of pregnant women, which is essential for healthy pregnancy and optimal fetal development. The present study aimed to develop nutrition and health education module for pregnant women to improve maternal nutrient intake quality and birth outcomes. **Methods:** The module was developed through activities namely: 1) literature review, 2) material development, and 3) material tryout on mothers with children under five or women in reproductive age (18–35 years) (n = 30). The topics covered in the module included 1) the importance of nutrient adequacy, 2) nutritious food for pregnant women and 3) the importance of physical activity during pregnancy for maternal and fetal health. **Results:** The use of the module as educational media significantly increased the pregnant women's knowledge on nutrition and health, with the score increased from 76.6 + 17.6 to 86.0 + 14.1 (p < 0.05). In addition, more than 90% of subjects stated that the format of the module was good and the content was easy to understand. **Conclusions:** The developed module is a potential tool to help improving nutrition deficiency problem among pregnant women in Indonesia. Intervention study to analyze the benefit of applying the module to pregnant women for improving their nutrient intake is needed to confirm the findings.

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Nutrition and Health Challenges for Infants and Children in Malaysia

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Keywords: Infants · Children · Stunting · Overweight · Anemia · Complementary foods

Background/Aims: Malaysia still struggles with the double burden of malnutrition. Using a dedicated structured review methodology (NutriPlanet), this study assessed current nutrition and health situation in Malaysian 0–6 years old children. **Methods:** Data search and analysis used PubMed, CAB, and Embase libraries covering their collection from 1996 to 2016 and it was completed with records from local journals, non-indexed nationwide reports, and latest information. The project included interviews with 18 opinion leaders to verify findings and bring conclusions into perspective. **Results:** Based on the NHMS surveys, both stunting and overweight in under-5 children have not improved between 2006 and 2017, with prevalence of 18–20 and 5–7%, respectively. The SEANUTS study (2010/2011) reported combined prevalence of overweight and obesity of 4–6% and 16–17% for ages 1–4 years and 4–7 years, respectively. Most experts judge anemia in young children no longer to be a problem, but in World Bank and WHO statistics, a prevalence of >30% is still reported. The SEANUTS study reports anemia prevalence of 11–17% among Malaysian 4–6 years old children. In a study on appropriateness of complementary feeding practices for 6–24 months old children, timely introduction of complementary food was rated as good, but the quality of the complementary food was assessed as moderate to low. Concerns about high intake of sugar have been voiced, but there is insufficient information for children 1–6 years old. **Conclusions:** Malaysia still needs to take the final step towards reducing stunting, amidst rising concerns for overweight. Adequate quality of complementary feeding with dietary diversity should be accorded priority in the public health nutrition agenda.

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Comparison of Nutrient Intakes between Young Child Milk Consumers and Non-Consumers in 12–36 Month Old Chinese Children

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Keywords: Growing-up milk · Children · China · Nutrient intake

Background/Aims: It has been reported that the consumption milk beverage for young children (YCMB), or also called as growing up milk (GUM), is associated with reduced risk of inadequacies of iron and vitamin D, nutrients that are frequently lacking in the

diets of young children in several European countries. The objective of this study was to investigate the impact of YCMB consumption on nutrient intake in 12–36 month old children in China. **Methods:** Dietary intake data from the 2012 China Maternal and Infant Nutrition and Growth study were analyzed. In total, 910 children aged 12–36 months were included. Nutrient intake and prevalence of inadequate intake were compared between YCMB consumers and non-consumers. **Results:** It was found that 64% children consumed YCMB in China. The average energy intake was similar between YCMB consumers and non-consumers. YCMB consumers had higher intake of calcium, iron, and vitamins (A, C, and D) as compared to non-consumers after adjusting for age, gender, family income, and energy intake (p < 0.001). The intake of docosahexaenoic acid (DHA) was also higher among YCMB consumers, whereas the intake of saturated fat was lower (p < 0.001). The prevalence of inadequate intake of calcium (59% vs. 81%), iron (34% vs. 53%), zinc (19% vs. 31%) and vitamin D (59% vs. 78%) were lower in YCMB consumers than in non-consumers (p < 0.001). **Conclusions:** Consumption of YCMB (GUM) could help improve nutrient intake in children aged 12–36 months in China.

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Diet Diversity, Nutritional Status and Birth Size among Young Rural Mothers in Maharashtra, India

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Keywords: Low birth weight · Maternal anthropometry · Diet diversity

Background/Aims: This study aimed to assess maternal anthropometry and diet diversity in relation to the risk of low birth weight (LBW) among young rural mothers in India. **Methods:** Full-term mothers (n = 200) registering at ≤13 weeks of gestation at the primary health center in villages around Pune, were enrolled in the study. Information on socio-demography and anthropometric measurement (weight, height, sitting height, head circumference, and body fat) were recorded at registration. Diet diversity was assessed using FAO questionnaire and birth size was recorded. **Results:** Majority (32%) of the mothers was undernourished (BMI <18.5 kg/m^2). Mean birth weight was 2662 ± 502 g with high prevalence (26.5%) of LBW. Significant risk for LBW was observed among mothers with poor nutritional status (weight <42.26 kg; OR = 3.2; CI: 1.4–7.1, BMI <18.5 kg/m^2 -OR = 3.5; CI: 1.5–8.3, and body fat <22.73-OR = 6.5; CI: 2.7–15.3) at registration. Additionally, chronic maternal undernourishment (sitting height <70 cm – OR = 2.8; CI: 1.2–6.2; small head circumference <52.16 cm -OR = 3.2; CI: 1.5- 6.8), and low diet diversity score (≤3) was associated with high prevalence (OR = 5.72; CI: 2.5–13) for LBW along with an increased risk for absence of foods; milk (OR = 6.9; CI: 2–23.6) , green leafy vegetables (OR = 5.18; CI:2.3–11.2), fruit (OR = 2.8; CI:1.3- 6.2), and eggs (OR = 15.6; CI: 2–118). These factors were significant after adjusting for body fat indicating independent influence of maternal diet. **Con-**clusions:** Our findings highlight the importance of dietary diversification among undernourished mothers for better pregnancy outcome.

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Association between Nutritional Factors and Severity Among Children with Autism Spectrum Disorder in Malaysia

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Keywords: Autism severity · Autism Spectrum Disorder · Children · Nutritional factors

Background/Aims: Children with Autism Spectrum Disorder (ASD) from higher autism severity exhibited different behaviors and characteristics compared to those with low autism severity. There is lack of study on the nutritional status of these children in Malaysia. Therefore, this cross-sectional study aimed to determine the associations between parental feeding practices, child eating behaviors, and body weight status with autism severity in children with ASD. **Methods:** A total of 224 children (82.6% boys and 17.4% girls) with a mean±SD age of 5.19 ± 0.87 years and their mothers were recruited from PERMATA Kurnia using purposive sampling. Mothers completed a self-administered questionnaire on socio-demographic background, parental feeding practices, and child eating behaviors. Weight and height of the children with ASD were also measured. **Results:** Total score of Social Communication Questionnaire (SCQ) ranged from 3 to 38 (20.12 ± 6.93), indicating moderately high autism severity. Approximately 10.2% of the children were underweight, 12.2% were stunted, and 12.2% were overweight or obese. Multiple linear regression analysis showed that father's employment status, perceived child weight, concern about child weight, and ethnicity of the child significantly predicted autism severity in children with ASD. **Conclusions:** Intervention studies involving parents of children with ASD should be carried out to improve their feeding practices to foster healthy eating environment for their children.

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Effect of Low Linear Growth and Caregiving with Poor Psychosocial Aspects on Cognitive Development of Toddlers

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Keywords: Cognitive development · Stunting · Indonesian children · Psychosocial aspect of caregiving

Background/Aims: The purpose of this study was to analyze effect of linear growth and psychosocial aspects of caregiving on cognitive development of toddlers. **Methods:** Longitudinal studies were carried out from pregnancy to three years old children in Bogor. The collected data included body height, nutritional status based on height by age index, morbidity, aspects of caregiving, and cognitive development of three years old children. Multiple logistic regression was applied to analyze the effects. **Results:** Toddlers who were born stunted and continued to be stunted until they were three years old had lower cognitive development than stunted newborns that were able to achieve normal height at three years old. In addition, children who experience caregiving with poor psychosocial aspects had lower cognitive development than those with good caregiving. **Conclusions:** This study highlighted the importance efforts to improve nutritional status of children as well as providing good care for them.

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Risk Factors of Vitamin D Deficiency among Third-Trimester Pregnant Women in Malaysia: Findings From The Maternal and Infant Cohort Study (Micos)

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Keywords: Vitamin D · Pregnancy · Ethnicity · Pre-pregnancy BMI

Background/Aims: Vitamin D deficiency during pregnancy is associated with adverse health outcomes in mothers and their infants. However, limited evidence on vitamin D status is available for pregnant women in Malaysia. The aim of this study was to determine the prevalence of vitamin D deficiency and its associated factors among third-trimester pregnant women in Malaysia. **Methods:** A total of 535 pregnant women with mean age of 29.9 ± 4.1 years old at ≥28 weeks of gestation were recruited from six government health clinics at the state of Selangor and Kuala Lumpur. Chemiluminescent immunoassay was used to measure concentration of serum 25-hydroxyvitamin D (25(OH)D). Data on socio-demographic, obstetrical history, vitamin D intake, and duration of sun exposure were obtained through face-to-face interviews. **Results:** Out of the 535 respondents, 47.7% were vitamin D deficient (serum 25(OH)D <30 nmol/L) and 44.3% were vitamin D insufficient (serum 25(OH)D 30–<50 nmol/L). The multivariate logistic regression model indicated that those who were non-Malay (OR = 0.31, 95% CI = 0.12–0.79) and achieved the recommended daily vitamin D intake level (OR = 0.25, 95% CI = 0.11–0.59) had a lower risk of vitamin D insufficiency or deficiency as compared to their counterparts. Compared with those who had normal weight before pregnancy, respondents who were overweight or obese pre-pregnancy had two times higher risk for vitamin D insufficiency of deficiency (OR = 2.55, 95% CI = 1.11–5.86). **Conclusions:** Vitamin D insufficiency or deficiency was highly prevalent among pregnant women at the two states in Malaysia. Malay women who had pre-pregnancy overweight or obesity and had low vitamin D intake should be targeted for pre-conception counseling on vitamin D intake to prevent the progression of vitamin D insufficiency deficiency during pregnancy.

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Biomarkers of Aging and Micronutrient Status in Frailty

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Keywords: Micronutrient status · Aging · Frailty · Biomarkers of aging · Older adults

Background/Aims: Frailty, a geriatric syndrome, is considered as a major public health concern among older adults. It is a multi-dimensional biological process resulting from interaction of different pathways, including multiple anabolic deficiency, oxidative stress, inflammation, and poor nutritional status. The study aimed to investigate the micronutrient status and biomarkers of aging and their association with frailty. **Methods:** This community-based cross-sectional study involved 125 older adults aged ≥60 years residing in Hyderabad, India. Anthropometric data, clinical parameters, and micronutrient status were assessed. Plasma levels of advanced glycation end products (AGEs) were assessed cumulatively as AGE-index (AGI) by spectrofluorometry. Erythrocyte aldose reductase (ALR2) activity and plasma protein carbonyls were analyzed by spectrophotometer, while erythrocyte sorbitol level was determined by by spectrofluorometer. Meanwhile, plasma homocysteine was assessed by HPLC and interleukin (IL-6) as well as insulin-like growth factor (IGF-1) were determined using ELISA. **Results:** The prevalence of frailty was 25% among the subjects and it was higher in anemic group (37%) than in the normal group (20%). The prevalence of micronutrient deficiency was high in the frail group. Moreover, in the frail group, urinary albumin to creatinine ratio was significantly high and hemoglobin was significantly low. Furthermore, median values of ALR2, AGI, and IL-6, were significantly high, while IGF-1 was significantly low in the

frail group. Interestingly, 64% of frail individuals had hyperhomocysteinemia (>15 μmol/L). **Conclusions:** Micronutrient status had influence on biomarkers of aging that are associated with frailty. A better understanding of these markers along with micronutrient status could aid in developing suitable intervention strategies to this multidimensional process in older adults.

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Reliability and Validity Study of Children's Eating Behavior Questionnaire in Chinese School Children

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Keywords: Reliability · Validity · Eating behavior · Questionnaire · School children

Background/Aims: Children's Eating Behavior Questionnaire (CEBQ) is widely used in western countries to measure children's eating behavior and it plays an important role in researches on risk of childhood obesity; however, it is not commonly used in China yet. In order to introduce CEBQ to more studies on eating behavior of Chinese children, it is strongly necessary to examine its reliability and validity in target population first. **Methods:** Data was collected using Chinese-version CEBQ using 396 school children from grade one to grade five of an elementary school in Songjiang, Shanghai. The questionnaires were filled out by the children's parents. Two weeks later, 184 of them completed the re-test. **Results:** The Cronbach's α of the questionnaire was greater than 0.7, indicating that the questionnaire had good internal consistency. Except for the subscales "emotional under-eating" and "food fussiness", Pearson correlation coefficient of other subscales were greater than 0.5. It showed that test-retest reliability of the Chinese version of CEBQ was acceptable. **Conclusions:** Despite the limitations of the survey, the Chinese version of CEBQ were shown to have good reliability and validity, so it could be considered as a reliable tool to be applied in researches on eating behavior of Chinese school children and other related studies.

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Negative Body Image Is Associated with Obesity Status in among Older Adolescent (16–18 Years Old) at STIKes Mitra Keluarga

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Keywords: Adolescent · Body image · Nutritional status

Background/Aims: Body image is someone's perception toward her or his body that is derived from their thoughts and feeling. The image could be positive or negative and it can influence his/her nutritional status. Negative body image is often found among those with abnormal nutritional status. Thus, the objective of this study was to determine the relationship between body image and nutritional status among older adolescents at *STIKes Mitra Keluarga* Bekasi. **Methods:** The study used a cross-sectional design that involved 195 older adolescents (16–18 years old) with normal health status. The data collected by using Body Shape Questionnaire (BSQ) to assess their body image. Meanwhile, nutritional status was determined using Body Mass Index (BMI) for age (WHO anthropometry indicators). Data collected were analyzed using chi-square test with SPSS. **Results:** Proportion of underweight and overweight among subjects were 4 and 11.3%. There were 46.2% older adolescents with negative body image. There was relationship between body image and nutritional status among older adolescents at *STIKes Mitra Keluarga*. Among older adolescents who had negative body image, 23.3% were obese and 2.2% were underweight. Body Image had significant association with nutritional status of older adolescent in *STIKes Mitra Keluarga*. **Conclusions:** Negative body image was more common in obese adolescents than in those with underweight nutritional status. Future research is needed to see differences between obese and underweight adolescents in terms of negative body image.

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Factors Associated with Weight Gain on Pregnant Women in Semi-Urban Area of Bogor, Indonesia

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Keywords: Indonesian women · Iron supplementation · Pregnant women · Weight gain

Background/Aims: Weight gain during pregnancy is a simple predictor of pregnancy outcomes. Factors related to weight gain on pregnant women may vary in different areas. This study aimed at analyzing factors associated with weight gain of pregnant women in semi-urban area in Indonesia. **Methods:** The study applied a prospective cohort study with 76 pregnant women as the subjects and it was conducted in the semi-urban area of Bogor, West Java, Indonesia. Data on age, age of pregnancy, pre-pregnancy body weight, body weight at initial and end of pregnancy, mid-upper arm circumference (MUAC), intake of iron-folic acid supplementation, and hemoglobin concentration were collected. Weight gain was calculated in gram per week. **Results:** The mean ± SD of pre-pregnancy body weight and weight gain during pregnancy was 54.4 ± 10.5 and 10.5 ± 6.0 kg, respectively. Weight gain during pregnancy was negatively associated with pre-pregnancy body weight (p < 0.05) and positively associated with the number of iron tablets consumed (p < 0.05). There was no association between weight gain during pregnancy and age, education, and MUAC of the pregnant women. **Conclusions:** Optimum nutritional status prior to pregnancy and iron-folic acid supplementation are highly important for semi-urban pregnant women in Bogor.

Deficient Nutrient in Intake of Complementary Foods among Infants Aged 6–11 Months in Rural Areas of Yogyakarta

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Keywords: Children 6–11 months · Complementary feeding · Linear programming · Optifood

Background/Aims: Nutrition education message that is developed based on linear programming could help arrange food based recommendations (FBRs) using locally available food to improve infants' nutrient adequacy. This study examined deficient nutrients and optimized complementary feeding for infants. **Methods:** Data were collected from the Health District Office of Yogyakarta province that consisted of 91 breastfed infants aged 6–11 months old. Their dietary intake was assessed by quantitative 24-h recall and data were processed using the software Nutrisurvey, MS Excell, and Optifood. **Results:** Meat, fish, eggs, fruit, legumes, nuts, and seeds were infrequently consumed. Intakes of Fe and Zn could not fully reach the Recommended Nutrient Intake (RNIs), while the vitamins C, B6, folate, B12, and A could achieve 100% of RNIs by using optimized food pattern. Local foods that could be used to help improve the deficiency, except for Fe and Ze, were stated in the following FBRs: continue breastfeeding frequently; provide porridge at every main meal; provide meat, fish, and egg at every main meal (catfish/egg was minimum 3 portions/week; chicken liver was minimum 2 portions/week); offer legumes (e.g. mung beans) frequently minimum 2 portions/week; provide vegetables that are sources of vitamin C and vitamin A minimum 1 portion/week; consume fruit minimum 1 portion a week and minimum 3 portions/week for fruit rich in vitamin A. Additionally, fortified biscuits could be provided minimum 2 portions/week. **Conclusions:** Locally available foods had potentials to improve diet quality of infants aged 6–11 months, providing that the consumption frequency should increase. Consumption of food sources of Fe and Zn still needs to be improved in terms of both, portion and frequency.

Growth Status of Japanese Children Aged 3–17 Years in The 2012–2016 Japan National Health and Nutrition Survey

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Keywords: Children · Growth · National survey

Background/Aims: Monitoring growth of children using nationally representative samples is essential for planning and implementing public health policies to prevent obesity epidemic. Japan is unique among other industrialized nations, since obesity rate there has not risen dramatically in the recent decades. However, the high proportion of low birth weight infants (nearly 10% of live births) in the recent 20 years, may pose a future threat of rising obesity. In order to describe the current growth status of Japanese children, the recent anthropometric data was analyzed by applying the local and US 2000 CDC Growth Charts. **Methods:** A total of 8518 children aged 3–17 years from the 2012–2016 Japan National Health and Nutrition Survey, whose weight and height were within biologically plausible range, were selected. The z-scores for the child's sex and age for weight, height, and BMI were calculated, based on the CDC Growth Charts. **Results:** Mean (SD) Z score among boys for weight-for-age was –0.42(1.02), for height-for-age was –0.49(0.93), for BMI-for-age Z score was –0.21(1.08), and for girls, the values were –0.50(0.93), –0.58(0.91), and –0.21(0.94), respectively. The age at which mean BMI-for-age Z score were closest to zero was 11 years for boys and 6 years for girls. **Conclusions:** Japanese children were lighter, shorter, and smaller as compared with the CDC Growth Charts.

Effect of Substitution of Feed with Bone Marrow from Donggala and Bali Cows on Prenatal Postnatal Rat's Heart

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Keywords: Heart growth · Intrauterine growth retardation · Bone marrow · Donggala cows · Bali cows

Background/Aims: The objective of this study was to evaluate the potential of feed substituted with bone marrow of cows from Donggala and Bali that were kept semi-intensive traditionally in improving growth of prenatal and postnatal rats' hearts. **Methods:** The study was performed as an in vivo experimental work using animal models with a completely randomized design. Bone marrow was obtained from UPTD RPH Tawanjuka, Palu, Central Sulawesi, Indonesia, while 50 female rats and 20 male rats of Sprague-

Dawley type were supplied by Biopharmaca. This research received ethical approval from the Animal Veterinary Commission of Faculty of Veterinary Medicine, IPB University (SKEH Number: 077/KEH/SKE/XII/2017). Positively pregnant female rats were separated from breeding cages and then intervened with feed that had been prepared. Weaning was done after 24 days and necroption was performed after 30 days for removal of the heart. The heart of each subject was weighed and data collected were analyzed by Wilcoxon signed-rank test. **Results:** No significant differences were found in terms of heart weight between treated and control samples as well as between treatments. However, average weight the offspring's heart shows that FPSSTSDSint> FPSSTS-BSint> FPSSTSDTrad> FPSSTSBTrad> FMN> FPIUGR. **Conclusions:** There was no significant difference in cardiac weight of 30-day-old mice between the treatments FMN FPIUGR, FPSSTSD Sint, FPSSTSB Sint, FPSSTSD Trad, and FPSSTSB Trad.

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Effect Bone Marrow from Indonesian Local Cattles on Kidney Weight in Offspring Rats

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Keywords: Bone marrow · Bali cattle · Donggala cattle · Kidney weight

Background/Aims: Diet during pregnancy affects growth and development of fetal organ. Bone marrow from Donggala and Bali cattle contains nutrients that are needed for supporting organogenesis during pregnancy. The aim of this study was to evaluate the ability of feed substituted with the bone marrow of Donggala and Bali cattle for supporting fetal kidney growth during rat pregnancy. **Methods:** An experimental study was conducted using completely randomized design. Pregnant rats were given normal feed, Intrauterine Growth Retardation (IUGR)- induced feed, and feed substituted with the bone marrow of Donggala and Bali cattles. These local cattle were maintained semi-intensively and traditionally. Sixth formulations of the feed were made isocaloric. **Results:** After 23 days of birth, rat offsprings were weaned and they started to consume normal feed. Afterwards, young rats aged 30 days old were dissected and the kidney was weighed. Descriptive analysis and Krusskall-Wallis test were used for statistical analysis (P < 0.05). **Results:** There was no significant difference in kidney weight of offsprings whose mothers were given normal feed, IUGR- induced feed, and substitued feed. Nevertheless, descriptive analysis indicated that young rats from the group of substituted feed had greater kidney weight than those with normal and IUGR- induced feed. **Conclusions:** Bone marrow from Indonesian local cattle may have positive effect for supporting organ growth and development during pregnancy.

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Nutrition and Health Challenges Faced by Infants and Young Children in Thailand, Malaysia and Indonesia

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Keywords: Infants · Children · Stunting · Overweight · Anemia · Complementary foods

Background/Aims: Three studies recently used a dedicated structured review methodology (NutriPlanet) to assess current nutrition and health situation in 0–6 years old children in Thailand, Malaysia, and Indonesia. This paper provides a comparison between these countries. **Methods:** Data search and analysis for the three countries primarily used PubMed library for the period 1996–2016 and was completed with records from local journals, non-indexed nationwide reports, and latest information. The project included either workshop meetings or individual opinion leader interviews to verify findings and bring conclusions into perspective. **Results:** Stunting prevalence was around 10, 20, and 30% in Thailand, Malaysia, and Indonesia, respectively. In Thailand and Malaysia, stunting was persistently stable over the last decade and only Indonesia that has been seen to make some progress. Currently, the reported national prevalence for overweight and obesity in the three countries is around 8%. For Indonesia, several studies have shown that most of the overweight young children are also stunted. In Thailand and Malaysia, concern has been raised on protein intake that exceeds 300% of the recommendation. Similarly, the three countries are facing challenge in terms of excess sugar intake, although conclusive data has not been available yet. Fat quality is suboptimal in Indonesia and it is likely that a similar situation also presents in the other two countries. Prevalence of anemia among young children is high in Indonesia (>50%), moderate in Thailand (26–42%), and inconclusive in Malaysia. **Conclusions:** While the actual position of the three countries in terms of nutritional transition journey is different, major concern related to double-burden of malnutrition are similar including improvement of the quality of complementary feeding and household diets.

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Influence of Antenatal Steroids and Feeding Pattern on Nutritional and Clinical Outcomes in Infants with Very-Low-Birth-Weight during Hospitalization

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Keywords: Very-low-birth-weight infants · Antenatal steroids · Feeding pattern · Nutritional and clinical outcomes

Background/Aims: Studies showed that application of antenatal steroids and feeding pattern influenced gastrointestinal function in infants with very-low-birth-weight (VLBW). However, ef-

fect of the two factors, including their interaction, on nutritional and clinical outcomes has not been clearly defined yet. Thus, this study aimed to observe the effect of antenatal steroids and feeding pattern on nutritional and clinical outcomes during hospitalization of infants with VLBW. **Methods:** A retrospective cohort study including 986 infants with VLBW was performed in six NICUs in South China. Univariate analysis was used to compare general characteristics, nutritional clinical outcomes among groups, and different feeding patterns. Multiple linear regression and logistic regression analysis were used to analyze association between antenatal steroids use and feeding pattern with nutritional and clinical outcomes. **Results:** Prenatal steroid shortened the time to initiate enteral feeding (less than 32 weeks) and it also helped to predict duration of intubated ventilatory support. Compared with 100% preterm-infant formula feeding, 100% breastfeeding and mixed feeding of breast milk and infant formula managed to shorten the time to initiate enteral feeding. There as a significant interaction effect between both factors on duration needed to regain birth weight ($\beta = -3.323$) (all p < 0.05). **Conclusions:** Antenatal steroids improved intestinal and respiratory function for infants with VLBW in less than 32 weeks. Feeding with 100% breast milk and mixed feeding reduced the time to initiate enteral feeding. In case of limited breast milk available, the use of antenatal steroids and 100% formula milk was shown to be best combination to shorten time needed to regain birth weight.

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Contribution of Milks and Formula to Dietary Calcium and Micronutrient Intake in 1–3 Years Old Children in Urban China: A Simulation Study

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Keywords: Nutrition, Young-children · Formula · Cow's milk · Dietary intake
Background/Aims: A recent dietary survey in five big cities in China provided information on various milk options consumed by 1–3 years old children. This study aimed to investigate the nutritional role of those various milks (young-child formula (YCF), cow's milk, others) by performing a simulation study. **Methods:** Daily intakes of calcium, iron, zinc, vitamins A, B1, B2, C, and E were calculated and compared to the Chinese Dietary Reference Intakes (DRIs). In Scenario 1, consumption of cow's milk, kid's milk and/or soy milk was replaced with similar amount of YCF (n = 66 children). Scenario 2 involved a total of 348 children who used to exclusively consume YCF and the YCF was replaced with similar amounts of cow's milk. **Results:** Scenario 1 revealed significant increase in total dietary intakes of iron, vitamins A, C, and E upon substitution of various milk products with YCF. Proportion of children who did not meet the Estimated Average Requirement (EAR) for those nutrients dropped from 28, 24, 39, and 37%

to 12, 11, 27, and 24%, respectively. In Scenario 2, the hypothetical substitution of YCF by cow's milk increased the proportion of children not meeting the EAR for those nutrients and vitamin B1 from 10, 5, 14, 14, and 48% to 45, 24, 69, 59, and 77%, respectively. Execution of Scenario 2 in subgroups of 1–2 and 2–3 years old children revealed similar results. **Conclusion:** YCF may help to reduce the risk of insufficient intake of several key micronutrients for toddlers, independent of age.

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Maternal Lutein and Zeaxanthin in Relation to Offspring Visual Acuity at 3 Years of Age in The Gusto Study

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Keywords: Lutein · Zeaxanthin · Pregnancy · Visual acuity
Background/Aims: Deposition of lutein and zeaxanthin in the human macula, a specialized region responsible for visual acuity (VA), occurs early in life. Exposures to lutein and zeaxanthin in utero may thus influence early macular development and VA. This study examined the associations of maternal lutein and zeaxanthin with offspring VA in the GUSTO mother-offspring cohort. **Methods:** Maternal plasma lutein and zeaxanthin concentrations at delivery were determined by ultra-performance liquid chromatography. Snellen uncorrected distance VA of the right eye was measured in children at age 3 years and readings converted to logMAR (logarithm of Minimum Angle of Resolution; >0.3 logMAR as low VA). Associations were examined for 471 mother-child pairs using linear or Poisson regression adjusted for confounders (e.g. parental myopia). **Results:** Median (IQR) maternal lutein and zeaxanthin concentrations were 0.23 (0.16, 0.32) and 0.16 (0.12, 0.20) mg/L, respectively, while 126 children (26.8%) had low VA. At age 3 years, the highest tertile of maternal zeaxanthin concentration was associated with 0.03 (−0.06, −0.001) lower logMAR and 36% (0.43, 0.95) lower risk of low VA. Higher maternal lutein concentration was associated with better VA, with significant association observed for the middle tertile [β −0.04 (−0.07, −0.003) logMAR;

RR 0.62 (0.42, 0.91) low VA] and trends in similar direction for the highest tertile [β −0.01 (−0.04, 0.03) logMAR; RR 0.75 (0.49, 1.15) low VA]. **Conclusions:** Maternal lutein and zeaxanthin in utero might have potential roles on offspring VA. The clinical implications on children's visual health will need confirmation in longer-term studies.

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Development of Complementary Feeding Recommendations by Linear Programming to Improve Nutrient Adequacy of Filipino Children 12–23 Months Old

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Keywords: Complementary feeding recommendations · Linear programming · Optifood · Filipino children

Background/Aims: Infants and young children from six months onwards need energy and nutrient-dense complementary foods. This is a challenge in the Philippines, where poor feeding practices are common and plant-based gruels of poor nutrient density are fed to young children. A cross sectional survey was conducted in Mercedes, Camarines Norte Province, to determine nutrient adequacy of young children's diet and develop local food-based complementary feeding recommendations (CFR). **Methods:** A 24-hr recall was administered on food intake of children 12–23 months (n = 127) and market survey was conducted to determine the cost per 100 g edible portion of commonly consumed foods. Linear goal programming using WHO Optifood software was applied to develop local food-based CFR and identify nutrients whose recommendations could not be met by local foods. **Results:** The findings showed that a local diet alone could not ensure adequacy for some nutrients, even when the diets were optimized. Iron and zinc were absolute nutrients in problem, while calcium, niacin, and vitamin B6 were partially problematic nutrients. Integrated into the final CFRs, several locally available ingredients were included e.g. chicken liver, anchovy, and moringa (*malunggay*) leaves that could help increase nutrient density of the problematic nutrients. **Conclusions:** The final set of CFRs could not only provide the best levels of the problematic nutrients, but it could also guarantee adequacy (% RNI ≥ 65%) for all the other nutrients. The linear programming approach may be useful in improving complementary feeding diets and the feasibility of these CFRs needs to be tested.

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Nutrition and Health Education Program Improves Anemia Status of Adolescent Girls in Bogor, Indonesia

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Keywords: Adolescent girls · Hemoglobin level · Nutrition education · Nutritional status

Background/Aims: Proper nutrition during adolescence determines nutritional status in adulthood, which in the long run, influences the nutritional status of their children. Consequently, nutrition programs targeting adolescent girls are highly required. This study was aimed to analyze effectiveness of Adolescent Nutrition and Health Education Program on nutritional and anemia status of adolescent girls. **Methods:** A quasi experimental study was conducted in junior high school (JH) and vocational high school (VH) in Bogor, Indonesia. The intervention group consisted of one JH and two VHs (n = 112) and the control group consisted of one JH and one VH (n = 129). Teachers from the intervention group were trained for two days on health and nutrition for adolescents using a nutrition and health module. Then, the teachers delivered nutrition education sessions at their schools for 14 weeks using the module. Before and after the education program, body weight, body height, and hemoglobin level of the subjects were measured. Paired and independent t-test was used to analyze effect of the intervention. **Results:** There was no significant change on height at end line. There were significant changes in body mass index-for-age z-score (BAZ) at end line in both groups. Average BAZ decreased significantly in intervention group, while it increased significantly in control group. Prevalence of anemia at baseline was higher in the intervention group (35.7%) than that in the control group (27.9%). At end line, average hemoglobin level of intervention group increased significantly compared to baseline, while in control group, it decreased significantly. **Conclusions:** These findings suggested that nutrition education delivered by teachers could help improve anemia status of adolescent girls.

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To Know and to Act: Increasing Knowledge of Milk Code and the Use of Innovative Platform to Report Milk Code Violations

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Keywords: Code on marketing · Infant formula · Breast milk

Background/Aims: The Philippines Executive Order 51 (EO 51), called the "Milk Code", prevents marketing of formula milk to health workers, while the Expanded Breastfeeding Promotion Act (R.A 10028) calls for the integration of infant and young child feeding (IYCF) topics into all health professional curricula; however, the latter policy has not been fully implemented. The Mother-Baby Friendly Philippines (MBFP) project aimed to improve implementation of E.O 51 and R.A 10028 by increasing knowledge among health professionals and creation of an enhanced system for reporting Code Violations. **Methods:** A total of 3,813 health professionals, local health and nutrition workers, breastfeeding support groups, local chief executives, and community members were trained on IYCF, EO 51, RA 10028, and the reporting platform. Of the trained participants, 3,304 completed pre-test and 3,564 took post-test. The average pre- and post-test passing rates were 33.6 and 70.3%, respectively. The pre-test administered to members of health professional organizations confirmed a gap in knowledge around the provisions EO 51 and RA 10028. Training provided to health professionals emphasized their need to know the Milk Code law beyond its title, how certain practices by formula companies impinge on their rights, and how to advocate for their rights by reporting violations. **Conclusions:** The creation of enhanced reporting platform and mobile app could fill an important gap by providing hand-held access to information and platform to report violations.

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Infant and Young Child Feeding Practices among Low Income Families in Malaysia

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Keywords: Infant and young child feeding · Breastfeeding · Complementary feeding · Low household income

Background/Aims: A cross-sectional study was conducted to assess infant and young child feeding (IYCF) practices in Kuala Lumpur and Kuala Selangor, Malaysia. **Methods:** A total of 321 respondents (163 boys and 158 girls) among the bottom 40% (B40) household income families were involved in this study. A validated questionnaire completed by interview with parents was used to obtain information on sociodemographic characteristics as well as IYCF practices. **Results:** Mean age of the respondents was 13.28 ± 5.15 months old. The prevalence of early breastfeeding initiation within one hour of birth, ever breastfed, and continued breastfeeding after six months old was 78.1% (95% CI: 73.00–83.00), 99.1% (95% CI: 98.00–100.12), and 75.8% (95% CI: 71.0–81.0) respectively. The prevalence of bottle feeding practices was 78.1% (95% CI: 73.57–82.68) and ever used a pacifier was 36.8% (95% CI: 31.46–42.12). The prevalence of milk feeding frequency among children who were taking more than two feeds within 24 h was 88.1% (95% CI: 84.0–93.0). The prevalence of minimum meal frequency (children who received solid, semi-solid, and soft food for breastfed and non-breastfed children) was 95.0% (95% CI: 89.0–101.0). However, the prevalence of minimum dietary diversity (MDD) (children who received four or more food groups during the previous day) and minimum acceptable diet (MAD) were only 52.7% (95% CI: 47.0–58.0) and 56.6% (95% CI: 50.98–62.18), respectively, indicating only 1 of 2 respondents met the MDD and MAD. **Conclusions:** To ensure optimal growth and development of children especially in the first two years of life, it is important that parents are taught and given the knowledge on appropriate practices on complementary feeding and nutrition.

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Determinants of Mother's Feeding Choices and the Effect on Infants Growth Status in Petaling District, Selangor

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Keywords: Breastfeeding · Socio demographic · Obstetric · Nutritional status

Background/Aims: Breastfeeding and formula feeding both provide energy, hydration, and nutrients to achieve optimal infant growth. Despite the advances in formula milk production, breast milk has unique benefits on immune and digestive system as well as on brain development. This study was to determine factors associated with mother's feeding choices and the effect on the infant's growth status. **Methods:** A cross sectional survey was conducted among 694 mothers whose infants less than 2 years old in 10 health clinics in Petaling district, Selangor. A validated questionnaire was administrated to assess maternal socio demographic background, current diet, and weight status. Growth pattern of the infants was compared between breastfed and formula-fed infants. All data was analyzed using SPSS 23 and Nutritionist Pro software. **Results:** There was a significant association between socio-demographic, obstetric characteristics, maternal nutritional status, and breastfeeding (p < 0.05). Poor maternal diet was inversely associated with breastfeeding. There was a significant difference in the growth of infants as affected by their mothers' feeding choices (p < 0.05). **Conclusions:** The study emphasized that breastfeeding is the preferred feeding choice moderated by socio-demographic back-

ground, obstetric characteristics, and maternal nutritional status. This information could be useful for policy makers in facilitating targeted breastfeeding promotion strategies.

Complementary Feeding Practices of Filipino Mothers with 6–11-Month-Old Infants Based on Food Attributes Exercise (FAE)

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Keywords: Food attributes exercise · Complementary food
Background/Aims: Poor complementary feeding practice is one of the reasons why stunting is a public health problem in the Philippines. This study used food attributes exercise in describing the food intake of 6–11 months old infants and in identifying positive and negative characteristics attributed to complementary foods. **Methods:** Key complementary food list was developed, validated, and used in Quezon, Camarines Norte, Leyte, and Sulu. Each food was shown one-by-one to 48 mothers and they were asked to describe their positive and negative attributes. **Results:** The infants were between 1 to 8 months old when complementary food was introduced to them. Rice cake (in Quezon) and papaya (in Leyte) were the earliest food given to infants at 1 month old. "Patikim" or giving of small amount of food to infant was a common practice. Only 8 complementary foods were given to 70% of infants with egg (100%), potato (98%), and rice (96%) as the most common foods given. Green and leafy vegetables were seldom fed to the infants. Positive attributes of food given included delicious, nutritious, easily digested, healthy, and satiating. "The food can cause indigestion or flatulence" was the main reason for not introducing a particular complementary food. Other negative attributes included presence of additives; unpleasant taste; and risks of choking and diarrhea. **Conclusions:** Complementary feeding practices among Filipino 6–11 months infants were not optimal yet. However, results of this FAE could be used in crafting communication plan not only to improve practices but to overcome negative attributions to complementary food.

Sugar-Sweetened Beverage Intakes and Its Associated Factors among Young Children in Malaysia

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Keywords: Sugar-Sweetened Beverage (SSB) · Dietary factors · Lifestyles · Young children
Background/Aims: There is little information about the multifactorial aspects of diet, lifestyle, and parental characteristics associated with habitual SSB consumption in Asian children. This study aimed to assess habitual SSB intake patterns related to dietary and lifestyle practices and parental characteristics of 590 Malay- and Chinese-young children aged 3 to 6 years old in Kelantan, Malaysia. **Methods:** Pre-piloted parental questionnaires were used to assess dietary and lifestyle practices. Anthropometry assessments were taken for both, participants and their parents. **Results:** Multiple logistic regression models showed that dietary factors such as more frequent snacks consumption [OR 2.7; 95% CI, 1.6–4.4; p < 0.001] and greater fast food intake [OR 3.5; 95% CI, 1.9–6.3; p < 0.001] were associated with higher SSB intake, as compared to lower intakes of snacks and fast-foods. Participants with higher fruit and vegetables intake per day had lower SSB intake [OR 0.4; 95% CI, 0.2–0.8; p < 0.05] compared to those with lower daily fruit and vegetable intakes, after full adjustment of biological and parental characteristics as well as dietary and lifestyle confounders. A positive association between higher weekly vigorous PA status [OR 1.9; 95% CI, 1.0–3.4; p < 0.05] and daily screen-based practices [OR 2.0; 95% CI, 1.2–3.6; p < 0.05] with habitual SSB intake was also reported, after full adjustment of potential confounders. These results suggested that multiple dietary and lifestyle factors might significantly influence SSB intake among young children. **Conclusions:** There should be continued effort to encourage healthier alternative beverage choices, as well as healthy dietary and active lifestyle practices among children during their critical years of growth.

Breastmilk Iodine Level and Infant Development in Replete and Non Replete Iodine Area

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Keywords: Replete · Iodine · Breast milk · Infant · Development
Background/Aims: Infants are at high risk of iodine deficiency since their need for iodine in each kilogram body weight is higher compared to all other periods throughout the life cycle. The most effective pathway for iodine intake in infants is through breast milk. Unfortunately, breastfeeding women are prone to iodine insufficiency. Replete iodine is an area previously stated as endemic

to iodine deficiency, but they are currently in better state due to intensive program. This study aimed to analyze sufficiency of iodine in breast milk and its prevalence in replete and non-replete iodine area and the effect on infant development. **Methods:** This was a cross-sectional study, with 213 pairs of mother and infants in replete and non-replete iodine area in Magelang. Breast milk iodine level, infant development using BSID 2, and infanib were assessed. **Results:** Breast milk iodine levels in replete area (30 μg/L) were significantly lower than non-replete area (60 μgr/L); however, both areas were still not optimal (<100 μg/L). The risk for breastfeeding mothers in replete iodine area for having non-optimal iodine breast milk level were 4.94 times (95% CI; 1.691–14.425). Infants in iodine replete area experienced higher risk of psychomotor (1.38 times; 95% CI 1.013 to 1.723) and neurological (1.47 times; 95% CI 1.032–2.125) developmental delay. Breast milk iodine level correlated significantly with psychomotor development (p < 0.05). Infants in replete iodine area and with lower maternal iodine breast milk level were at higher risk for experiencing psychomotor development delay. **Conclusions:** Attention is needed for breastfeeding mothers to optimize breast milk iodine levels, especially in replete iodine area.

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Effects of Multimicronutrient Supplementation In Preconception Period Against VEGF/Sflt-1 Ratio and Birth Weight: A Randomized, Double Blind Controlled Trial In Banggai Regency, Central Sulawesi

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Keywords: Preconception period · Multimicronutrient · Birth weight · VEGF · Sflt-1
Background/Aims: Beneficial effects of MMN and Iron and Folic Acid (IFA) supplementation on pregnancy outcomes are still debatable. Multimicronutrient deficiencies may contribute to birth weight which is associated with an imbalance of angiogenic factors against VEGF/Sflt-1 ratio in pregnancy. Thus the objective of this study was to identify effect of IFA and MMN supplementation since preconception period on infant birth weigh. **Methods:** The research was conducted in three sub-districts in Banggai, namely, Luwuk, North Luwuk, and South Luwuk. This was a double-blind study, randomized controlled trial that provided multi-micronutrient supplements for women from preconception period. The research used prospective design with saturated sampling technique. A total of 19 preconception women were kept updated until pregnancy and the pregnancy outcomes were enrolled from September 2016 to January 2018. The mean birth weight of infants born to pregnant women in the MMN group was heavier at 3142.5 g (p = 0.001). The percentage of LBW on pregnant women MMN group was smaller, equal to 8.3% with value (p = 0.863). The mean comparison ratio of Sflt1/VEGF in pregnant MMN group was lower, especially in the 1st trimester with 18.94 (p < 0.005). Differences were seen at preconceptions and 3rd trimester. Pregnant women who get MMN intervention had better infant birth weight. **Conclu-**

sions: Nutritional status of women before pregnancy is highly important to achieve mother and fetal welfare and it is considered as the most important thing for governing fetal growth.

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Obesity and Sedentary Behaviour as Emerging Factors for Iron Defeciency Anemia

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Keywords: Obesity · Sedentary · IDA
Background/Aims: Obesity has been predicted to be a corresponding factor for iron deficiency anemia (IDA). Iron is a key component of heme-containing proteins, which are essential for oxygen transport throughout the body. Sedentary activity and high level of fat might be contributing factors of IDA. This study aimed to examine relationship between physical activity, nutrition status, and IDA. **Methods:** A cross-sectional study was conducted among adolescents in the urban area of Surabaya. The study involved 132 subjects aged 12–16 years old. Physical activity level were obtained by self-reported method using PA questionnaire, while BMI for Age Z-score (BAZ) was used to measure nutrition status and level of hemoglobin was measured on site using portable measurement device. Association between variables was examined with Spearman's rank correlation. **Results:** Nutrition status of 66% of the subjects was normal and 33% of them were categorized as obese. A total of 24 subjects (18%) were identified to have sedentary behavior, while the rest of 108 subjects (82%) were revealed to have active daily activity, with basketball, volleyball, and cycling as their common physical activities. There was significant correlation between physical activity with IDA (p < 0.05); thus, physical activity could possibly contribute to minimize risk of IDA in adolescent girls. Abnormal parameter of hemoglobin status indicated iron deficiency existed in obese adolescents since there was significant correlation between obesity and low level of hemoglobin (p < 0.05). **Conclusions:** This study showed that there is a need to encourage adolescents to improve nutritional status and activity behavior.

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Maternal Depression is a Risk Factor to Malnutrition among Young Children in Malaysian Rural Area

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Keywords: Maternal depression · Malnutrition · Child feeding practices
Background/Aims: Maternal depression may affect child feeding practices and growth. However, results from previous studies were highly inconsistent and the topic is still under-researched es-

pecially in Asian countries. The study aimed to determine relationship between child feeding practices and current maternal depression with malnutrition among young children in a rural community. **Methods:** A case-control study was conducted that involved102 Malay mothers consisting of 52 mothers of malnourished children (cases) and 50 mothers of well-nourished children (controls) in Kuala Langat, Selangor, Malaysia. Cases were matched with controls by age, gender, socioeconomic status, and residential area. A structured questionnaire on child feeding practices was distributed to the mothers. Status of maternal depression was measured by using the Beck Depression Inventory Second Edition (BDI-II) questionnaire. **Results:** Depressed mothers stopped exclusive breastfeeding earlier (2.8 ± 2.1 months) than non-depressed mothers (3.7 ± 2.0 months) (p = 0.045). Current maternal depression was found to be the primary contributor that was associated with risk of malnutrition in children (AOR 2.5, 95% CI 1.08–6.09), followed by the number of children in the family (AOR 1.3, 95% CI 1.02–1.77). Mothers who experienced depression were twice as likely to have malnourished children. Each additional child in the family would increase the risk of malnutrition by 1.3 times. **Conclusions:** Maternal depression is associated with child feeding practices and it was shown to be a risk factor of malnutrition among young children. Thus, advice on optimizing mothers' mental health should be given in prenatal care and integrated during postnatal visits, which are crucial to prevent the incidence of malnutrition in children.

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Characterization of Complementary Foods of Selected Indigenous Children Age 6 to 24 Months from Mountain Province, Philippines

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Keywords: Complementary food · Indigenous children · Infant feeding · Food system
Background/Aims: Optimum complementary feeding at 6 to 23 months old is critical for children's physical and mental development. This study described the characteristics of diet of selected indigenous children aged 6 to 24 months belonging to the Bontoc tribe from Mountain Province in Cordillera Region, the Philippiness. **Methods:** Ethical clearance was secured for the study. Data on Dietary Diversity and Home Food Inventory (HFI) were collected and analyzed. Interviews and research observations were conducted to understand the context of feeding. **Results:** The mean age of the 32 subjects was 18 months. More than 70% of them had low dietary quality, mostly those aged 6–8 months. The most common food items consumed were grains and flour-based products, various pulses, and meat. Similar food groups made up most of the HFI. Notable food items recorded included leafy vegetables such as *malunggay* and *amti*, meats of carabao, wild pigs, and deer, snails collected from rice fields, and freshwater fish such as *idchew* or *wading*. These food items were gathered or hunted locally, suggesting stronger preference for traditional foods. Respondents be-

lieved in nutritional superiority and safety of whole foods compared to commercial food items. The study findings contributed to the growing knowledge on infant feeding of indigenous children, which are considered to be vulnerable groups. **Conclusions:** Utilization of traditional food items must be endorsed and integrated in the formulation of nutritionally-enhanced recipes for context-specific complementary feeding promotion. Future researches should further examine traditional food systems to identify opportunities that will contribute to the improvement of children's diet.

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Trials of Improved Practices (TIPs) on Infant Feeding Among Mothers of 0 To 5 Month-Old Infants in the Philippines

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Keywords: TIPs · Malnutrition · Breastfeeding · Infants
Background/Aims: A key driver of child malnutrition in the Philippines is suboptimal infant feeding practices including delayed initiation of breastfeeding, short duration of exclusive breastfeeding, and non-exclusive breastfeeding. This study sought to test recommendations for improved breastfeeding behavior among mothers of 0 to 5 month-old infants. **Methods:** Using a formative research approach called trials of improve practices (TIPs), 48 of purposively selected mothers of 0 to 5 month-old infants in Camarines Sur, Quezon, Leyte, and Sulu were interviewed twice on an interval of five days. The first visit focused on identifying nutrition problems affecting breastfeeding and continued with recommending and negotiating practices to improve breastfeeding. The second visit assessed whether the recommendations were followed and identified reasons for compliance or non-compliance of the recommendations. **Results:** The problems ranged from perceptions to real situations, such as that of inadequate mother's milk, lack of attention to hunger cues, early introduction of fluid and semi-solid complementary foods, provision of vitamin/mineral supplements, and poor positioning and latching during breastfeeding. Recommendations with simple and doable actions such as recognition of hunger cues, proper positioning and latching during breastfeeding were received easily and acted upon immediately. Reasons for complying were expressed as "for the good of the baby," "to save money," and "to feel better." **Conclusions:** The TIPs among mothers with 0 to 5 month-old infants described current feeding practices, identified problems in various contexts, and generated problem-based recommendations. Motivations and barriers to optimal infant feeding could be important considerations in designing interventions for behavioral change.

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Anthropometric and Biochemical Assessment of Nutritional Status among Filipino Children Aged 5 Years and Below

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Keywords: Anemia · Stunting · Underweight · VAD · Wasting · Zinc

Background/Aims: One of the major predictors of child survival is their nutritional status. Among pre-school children, malnutrition occurs prominently and it has become a major public health concern particularly in developing countries. In this study, the nutritional status of children aged 5 years and below was assessed using anthropometric and biochemical variables. **Methods:** A multistage stratified design was used for the national survey. A total of 13,423 children aged 0–60 months were included in the anthropometric measurements while 3,190 children aged 6 months to 5 years participated in the biochemical phase. **Results:** Prevalence of underweight, stunting, and wasting among 0–60 months old children were 19.9, 30.3, and 7.9%, respectively. Incidences of stunting and wasting were significantly higher in the latest survey compared to the previous survey. Among the 6 months to 5 years old children, prevalence of anemia was 13.8%, which was classified as a mild public health significance. Children aged 6–11 months were the most affected age group with 40.5%. of anemia prevalence. Vitamin A deficiency (VAD) was considered a severe public health problem with a prevalence rate of 20.4%. Highest prevalence of VAD was also noted in children aged 6–11 months (27.9%). In terms of zinc status, 17.9% was found to be zinc deficient, a moderately high public health concern. A high prevalence of malnutrition was evident among children aged 5 years old and below based on the anthropometric measurement and biochemical variables assessed in the survey. **Conclusions:** Holistic health and nutrition promotion programs should be formulated to address the persisting incidence of under nutrition in children to ensure their survival.

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Dietary Intake and Food Sources of Omega-6 and Omega-3 PUFAs for Pregnant Women in Bogor, West Java, Indonesia

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Keywords: Pregnancy · Omega 3 · Omega 6 · Dietary intakes

Background/Aims: Omega-6 and omega-3 polyunsaturated fatty acids (PUFAs) are known to have essential role for fetal growth and development. This study aimed to investigate levels of dietary intake and food sources of omega-6 and omega-3 PUFAs in a cohort of Indonesian pregnant women in Bogor, West Java, Indonesia. **Methods:** Healthy pregnant women (n = 143) in their third trimester of pregnancy from 2 public health centers in Bogor were interviewed to complete 2x24 h food recall questionnaires.

Intakes of PUFAs (linoleic acid, LA; alpha linolenic acid, ALA; arachidonic acid, AA; eicosapentaenoic acid, EPA; docosahexaenoic acid, DHA) were compared with FAO dietary recommendations. **Results:** Estimated median (25th-75th percentile) of PUFAs intakes were: 10,191 (5,527–14,483) mg/day LA (recommendation: 4,400 mg/d), 593 (293–799) mg/day ALA (recommendation: 1.8 g/day), 2.1 (0.6–10.9) mg/day EPA (recommendation: 250 mg/d), and 38.6 (18.9–67.0) mg/day DHA (recommendation: 250 mg/d). About 16% of participants had LA intake below the recommendation, while >95.8% participants had ALA, EPA, and DHA intakes below recommendation. Tempeh, tofu, palm oil, egg, and anchovies were the major food sources of PUFAs. Only 2 participants reported taking omega-3 supplement. **Conclusions:** The majority of pregnant women in Bogor met the recommended intake for LA (omega-6 PUFA), but the intakes for omega-3 PUFAs (ALA, EPA and DHA) were far below the recommended intakes with almost all participants did not meet the recommendation. These findings highlighted the need for increased PUFAs intake, especially omega-3 fatty acids during pregnancy by increasing consumption of omega-3 rich food and/or supplementation.

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Effects of Maternal Protein Restriction during Pregnancy on Renal Gene Expression Profiles in SHRSP Offspring

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Keywords: Hypertension · Protein malnutrition · DNA microarray

Background/Aims: Maternal protein restriction (MPR) during pregnancy is strongly associated with cardiovascular disorders in later life. In a previous study, MPR was shown to increase salt sensitivity in offspring of Stroke-Prone Spontaneously Hypertensive Rats (SHRSP). The aim of the current study was to evaluate the renal gene expression profiles in different life stages of SHRSP offspring (newborn, suckling) by using DNA microarray analysis. **Methods:** Female SHRSP rats were fed with 20% casein diet (control) or 9% casein diet (MPR) during pregnancy. Then, male offsprings were dissected and their kidneys were collected at three stages (newborn at 5th day after birth, D5; newborn at 10th day after birth, D10; suckling at 28th day after birth, D28). Total renal RNA was extracted and mRNA expression was measured by DNA microarray analysis. **Results:** Hierarchical clustering revealed that the clusters of D5-control and D5-MPR were clearly separated, whereas no clear separation was observed at other stages. A pathway analysis using Ingenuity Pathways Analysis (IPA) showed that one of the top canonical pathways of D5-MPR and D10-MPR was atherosclerosis signaling. In addition, top canonical pathways of D28-MPR included aldosterone signaling in epithelial cells and IL-17A signaling in fibroblasts. Focusing on cardiovascular signaling, eNOS signaling of D5-MPR was suppressed; instead, it was promoted in D28-MPR. **Conclusions:** Alteration of cardiovascular-related-pathways in young MPR offspring might be one of the key steps in developing higher risk of salt sensitivity in later life.

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Maternal Obstetrical Factors Are Associated with Birth Weight: A Health Clinic-Based Prospective Cohort Study in Malaysia

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Keywords: Obstetrical factors · Birth weight

Background/Aims: There was a growing interest in interaction between environmental exposure in early life and fetal development. This study aimed to examine contribution of maternal obstetrical factors on birth weight in selected health clinics in Malaysia. **Methods:** A total of 472 pregnant women were interviewed to get their socio-demographic and obstetrical information during the third trimester of their pregnancy and they were prospectively followed up until childbirth and birth weight was obtained when their infants were one-month old. **Results:** The study showed that 36.2% of the pregnant women were overweight and obese before pregnancy, with a mean pre-pregnancy body mass index (BMI) of 24.06 ± 4.96 kg/m^2. There were more pregnant women who gained insufficient weight than those who gained excessive weight during pregnancy (32.6% vs. 28.0%), with a mean gestational weight gain (GWG) of 12.22 ± 5.12 kg. The pregnant women recorded an average of 10.75 ± 2.96 times of antenatal care (ANC) visit during their pregnancy. Mean birth weight of infants was 3.02 ± 0.43 kg, with 10.4% of the infants were delivered weighing less than 2.50 kg. Regression analysis showed that maternal pre-pregnancy BMI, GWG, and frequency of ANC visit contributed to birth weight of infants ($p < 0.05$). **Conclusions:** The study showed that one in ten of Malaysian infants were born with low birth weight. Mothers with lower pre-pregnancy BMI, insufficient GWG, and lower ANC visit during pregnancy were more likely to deliver infants with lower birth weight. Hence, women need to have an optimal BMI before pregnancy, gain optimal weight during pregnancy, and attend every scheduled ANC visit throughout the pregnancy to improve infant birth weight.

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Failure of Exclusive Breastfeeding Practices in the First Month of Life in Urban Area

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Keywords: Exclusive breastfeeding · First month of life · Urban area

Background/Aims: Breastfeeding is a beneficial practice for the health and growth of an infant. Research shows that coverage of exclusive breastfeeding in some regions has not met the target and causes of failure are still unclear. This study aimed to investigate factors that are positively associated with failure of exclusive breastfeeding practices in the first month of life in Kedungmundu subdistrict, Semarang, Central Java, Indonesia. **Methods:** The study was a cross-sectional study with a total of 36 breastfeeding mothers who had just given birth recruited as subjects. The subjects' general characteristics were collected by structured interviews. Anthropometric measurements (body weight, height, mid-upper-arm circumference (MUAC), body fat percentage) and prelacteal feeding practice were also collected. Data were analyzed by Mann-Whitney U test and Chi-squared test. **Results:** Mean age of subjects was 29.1 ± 4.9 years. Median parity, body mass index (BMI), MUAC, and fat percentage were 2 children, 23.2 kg/m^2, 26 cm, and 29.6%, respectively. This study found that only 44.4% of the subjects breastfed their babies exclusively. There were no significant association between subjects' general characteristic and their anthropometric data ($p > 0.05$); however, provision of prelacteal feeding was positively associated with failure of exclusive breastfeeding practice ($p < 0.05$). As much as 63.9% of the subjects were housewives, but most of them preferred to give infant formula to their babies. **Conclusions:** Prelacteal feeding practice was found to be the main factor that influenced failure of exclusive breastfeeding practice in the first month of life in urban area.

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Do Health Workers Play A Role in Exclusive Breastfeeding among Working Mothers in Industrial Area?

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Keywords: Exclusive breastfeeding · Working mothers · Health workers · Industrial area

Background/Aims: The culture of breastfeeding has been inherited for a long time in Indonesia. Changes in lifestyle have caused an increase in the number of working mothers. Results of the Basic Health Research in 2018 reported exclusive breastfeeding coverage was decreased as much as 17% from 54.3% in 2013 to

37.3% in 2018. The purpose of this study was to determine association of health workers support and other factors on exclusive breastfeeding practice among working mothers in industrial area. **Methods:** A cross-sectional study was conducted in April-June 2018 in industrial area at Cibinong, Bogor, Indonesia. As many as 126 working mothers who had babies aged > 6–24 months were selected using a purposive sampling technique. Research variables were measured using a structured questionnaire. Data collected were analyzed by multiple logistic regressions. **Results:** Only 37.3% of working mothers breastfed their babies exclusively. The support of health workers was the most dominant factor associated with exclusive breastfeeding {(p = 0.002; OR: 9,410 (1,265–39, 0900)}. Maternal age {(p = 0.019); OR 3,523 (1,227–10,115)} and husband's support {(p = 0.005; OR: 8,277 (1,892–36,200)} were also associated with exclusive breastfeeding. Working mothers who obtained support from health workers were 9.41 times more likely to breastfeed exclusively as compared to mothers who did not receive support from health workers. **Conclusions:** Actual and direct support from health workers is important for mothers starting from the period of pregnancy to lactation. The support could be given as counseling, training, and assistance. Moreover, the existence of exclusive breastfeeding support groups for working mothers in industrial area is also needed. All those factors could be expected to improve the practice of exclusive breastfeeding.

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Cross Sectional Study on Factors Associated with Early Initiation of Breastfeeding in Rural and Semi Urban Areas of India

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Keywords: Breastfeeding · Early initiation of breast feeding · Nutrition · Infant and young child feeding · Lactation

Background/Aims: Despite efforts to improve early initiation of breastfeeding, its prevalence in India is still very low. The objective of this study was to analyze current practices related to initiation of breastfeeding directly after delivery or within 1–2 h in rural and semi-urban regions in India. **Methods:** Cross-sectional sampling was conducted in 20 villages each at Khagaria Bihar (rural area) as well as Khed, Pune, and Maharashtra (semi-urban areas). Structured interviews were conducted for post-natal mothers whose last child was under two years old (rural n = 281, semi-urban n = 250). **Results:** Early initiation of breastfeeding was higher in rural area than in semi-urban region (78% in rural area vs. 70% in semi-urban area). Factors that positively influenced early initiation of breastfeeding at least within 24 h were home delivery (institutional delivery = 17.6% vs. home delivery = 27.8%, p < 0.05). Furthermore, delivery that was assisted by nurse or trained birth attendant promoted early initiation of breastfeeding more than delivery by doctors (62.9% with doctors vs. 81.9% with nurses, p < 0.0001). Breastfeeding initiation rates within 1–2 h or 24 h after birth were found significantly lower in caesarean delivery (43% in caesarean vs. 80% in normal delivery, p < 0.0001). **Conclusions:** Although disparities between urban and rural areas exist, early ini-

tiation of breastfeeding in both areas was inadequate in both settings. High prevalence of caesarean section, assisted delivery by doctors, institutional delivery might influence the unfavorable breastfeeding behavior observed in the study area.

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Changes in Caregivers' Behaviors, Attitudes, and Problems Regarding Feeding/Diet in Japanese Infants and Preschool Children: Analysis from the Nationwide Surveys

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Keywords: Infant feeding · Preschool children · Japan · Policies and recommendations

Background/Aims: Ministry of Health, Labor, and Welfare, Japan has conducted nationwide nutrition survey on infants and children every 10 years since 1985. Several issues were highlighted i.e. changes in caregivers' behavior and attitude as well as problems they faced while feeding a child. Parenting practices towards foods and some other relevant factors were discovered by secondary analysis of the datasets to determine possible effects of national policies or recommendations. **Methods:** The authors investigated parenting practices and problems faced by caregivers during feeding. Published results (1985, 1995) and the results from secondary analyses (2005, 2015) were used to describe breastfeeding practices, initial provision of complementary foods, and problems faced by caregivers in taking care infants and preschoolers (0–5 years old) in Japan. **Results:** The latest survey in 2015 showed progress towards supportive environment for breastfeeding, resulting in an increased rate of breastfeeding (51.3 to 54.7%). Complementary foods were introduced later as suggested, shown in the 2007 survey, which implied effectiveness of a support guide titled "A support guide for breastfeeding and weaning" and subsequent activities for disseminating the guide. About 75% of the caregivers reported unsolved problems related to weaning practices. **Conclusions:** The caregivers believed that public health centers and municipality health service centers were the most important places to learn about diet required for children from infancy to preschooler age. Sustainable strategies to support these centers could strengthen them as well as provide ample opportunities to improve feeding practices and thus the nutritional status of children and their caregivers.

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Impact of Undernutrition in Early Life on Adolescents' Nutritional Status and Academic Performance: Evidence From Indonesia

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Keywords: Children · Undernutrition · Adolescent · Education

Background/Aims: Undernutrition in early life induces long-term effects on quality of life, including on health outcome and academic performance. Wasting is one of undernutrition indicators, which is defined as a weight-for-height below –2 Standard Deviation (SD) as stated by the World Health Organization (WHO) growth chart standard. To obtain evidence related to effects of childhood nutritional experiences on adolescents, Indonesian Family Life Survey (IFLS) data on wasted children under five were used and followed for more than a decade. **Methods:** Logistic regression and Ordinary Least Square (OLS) test were performed to analyze effect of nutrition status in the past to nutrition status and test score of adolescents. **Results:** The study found that during 14 years of life there was only 1 out of 5 children who recovered from wasting. In addition, suffering from wasting in childhood and being male children were almost 2 and 4 times more likely to be wasted in adolescence period, respectively (p < 0.05). Wasting children had significantly lower English test scores at junior high school national final exam. Male children were more likely to have higher test-score in Indonesian and English subjects. Additionally, having an educated mother significantly contributed to achieve higher test score in all national final subjects. **Conclusions:** Children who have been supplied with good nutrition from their early life by educated mothers are more likely to achieve brighter performance as adolescents.

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Effect of Maternal Food Consumption during Pregnancy on Eczema in Chinese Infants: A Cohort Study

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Keywords: Maternal diet · Pregnancy · Eczema

Background/Aims: There have been reports that maternal diet during pregnancy may affect development of eczema in the offspring. Studies have been carried out in developed countries, but the results are inconsistent so far. This study aimed to investigate association between maternal food group intake during pregnancy and risk of infantile eczema in Chinese population. **Methods:** A prospective birth cohort study was conducted and 523 women were recruited at 24–28 weeks of pregnancy in Guangzhou, China in 2017–2018. A validated 81-item quantitative food frequency questionnaire was used to assess the women's usual dietary intake in previous month. Food items were divided into ten food groups according to the Chinese Dietary Guidelines. The babies delivered were followed up until 6 months to observe the existence of symptoms of eczema. **Results:** The cumulative incidence of eczema for 6 months was 51.8%. Maternal consumption of poultry was higher in the eczema group (26.6 ± 22.4 g/day) than that in the control group (21.3 ± 20.5 g/day). Comparing to the lowest quintile (Q1), higher maternal intake of poultry (Q4) and fish (Q3) were significantly associated with an increased risk of infantile eczema (OR (95% CI): 2.9 (1.2, 6.7), and 2.4 (1.3, 4.7), respectively) after adjustment for the covariates. No significant associations were observed between maternal intake of cereals, legumes, vegetables, fruit, red meat, eggs, milks, and nuts and the risk of infantile eczema. **Conclusions:** Higher intake of poultry and fish during pregnancy might increase the risk of infantile eczema in Chinese population.

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Young Mom, Short Kid: Examining Social, Biological and Health Service Factors Linking Adolescent Pregnancy to Early Childhood Undernutrition in India

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Keywords: Adolescent pregnancy · Early marriage · Undernutrition · India · Pathways

Background: Adolescent pregnancy is a global public health concern, and in India, it involves one in five adolescents living in India, due to the widely practiced early marriage. This study sought to examine linkages between adolescent pregnancy and child undernutrition using a holistic approach. **Methods:** Data were collected from the National Family Health Surveys 2015–2016. Primiparous women aged 15–49 years (n = 60,096) were classified based on age at first birth: ≤19 years (adolescence), 20–24 years (young adulthood), and ≥25 years (adulthood). Multivariate regression and structural equation models were used to understand how adolescent pregnancy is linked to child undernutrition through women's education and bargaining power, nutritional status, health service use, child feeding, and living conditions. **Results:** Overall, 24% women gave first birth during adolescence, with large state and district variability. Compared to children who were born to adult mothers, those who were born to adolescents had lower z-scores for height-for-age (mean difference: –0.53 SD), weight-for-age (–0.40 SD), and weight-for-height (–0.16 SD). Compared to adult mothers, adolescent mothers were shorter (–1.2 cm), more likely to be underweight (+18%) and anemic (+8%), had lower education (–3.0 years), less bargaining power (–7% to –15%), and lived in poorer households (–0.66 SD) with poorer sanitation (–28%). Adolescent mothers were less likely to have access to health services (–4% to –15%) and they had poorer complementary feeding practices (–3% to –9%). These intermediate factors were predictive of child anthropometry, with the strongest links being women's education, socioeconomic status, and

weight. **Conclusions:** Policies and programs to delay marriage are likely to help break the intergenerational cycle of poverty and undernutrition in India.

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Key Predictors of Nutrition Knowledge and Practices During Pregnancy – An Exploratory Study From Two Districts in South and North India

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Keywords: Spousal interaction · Spousal support

Background/Aims: As per 2010 NFHS, the prevalence of low birth weight babies in India is 21.5%, which is around 40% of the global burden. Nutrition intake during pregnancy is a critical determinant of low birth weight in newborns. This study aimed to identify key predictors of nutrition knowledge and practices among pregnant women. **Methods:** Cross-sectional data from 20 villages each in Pune (South India) and Khagaria (North India) were collected using a structured questionnaire and analyzed. **Results:** Awareness on consumption of IFA and nutritious diet in pregnancy was higher in Pune (74.7% and 72.1%) than Khagaria (45.5% and 39.8%). Spousal interaction and support during pregnancy was higher in Pune (64.0% and 76.7%) than Khagaria (37.6% and 16.9%). The odds of pregnant women who interacted with their spouse being aware of IFA consumption was twice of those who did not (OR 2.087; p < 0.05).The odds of pregnant women who had spousal support being aware of the importance of nutrition in pregnancy was twice of those who did not (OR 2.170; p < 0.05). **Conclusions:** Spousal interaction and support could promote nutrition knowledge and practices among pregnant women.

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Effect of Daily Dietary Intake on Body Mass Index and Body Fat of Adolescents Aged 15–17 Years

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Keywords: Adolescent · Body fat · Energy intake · Obesity

Background/Aims: Examining daily dietary intake of adolescents is crucial to improve their nutritional status and more especially to prevent obesity. This study aimed to investigate the relation of dietary intake with body mass index and percent body fat in adolescents. **Methods:** A total of 156 adolescents aged 15–17 years were recruited randomly in this cross-sectional study. Daily dietary intake was collected using 6-days food records. Training was conducted before respondents administered the food record

and they were provided with food photographs to ease estimation of food intake. Data of height, weight, and percent body fat were measured directly using stadiometer and body impedance analyzer by trained nutritionist. Data were then analyzed using independent t-test. **Results:** Daily energy intake of adolescents was 2131.2 ± 582.7 kcal. There was no difference in energy intake between rural and urban population, but there was a significant difference in mean fat intake with the intake was higher in rural than urban adolescents (p < 0.05; 84.3 g/day vs. 75.6 g/day). In general, proportions of carbohydrate, protein, and fat intake to total energy were 55, 12, and 33%. Further analysis found that energy intake was related to BMI (p < 0.05; r = 0.167) as well as protein intake (p < 0.05; r = 0.187). Moreover, energy, carbohydrate, protein, and fat intake were all associated with body fat percentage (p < 0.05; r = 0.237; r = 0.246; r = 0.266). **Conclusions:** Daily energy intake could affect BMI and percent body fat of adolescents. Thus, adolescents are encouraged to maintain their energy intake as well as distribution of carbohydrate, protein and fat that should follow the recommendation as much as 55, 15, and 30%.

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Understanding Body Image Discontent and Body Image Perception among Adolescents

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Keywords: Adolescents · Body image · Body dissatisfaction

Background/Aims: The rising new perception on beauty and diet has contributed to unhealthy body image among adolescents. This necessitates understanding of current pointers of body image satisfaction in relation to BMI, to prevent faulty mismanagement of weight in adolescents. This study aimed to understand body image discontent among adolescents using indicators of body image perceptions. **Methods:** This cross-sectional study was conducted on randomly selected 112 adolescents (66% boys and 34% girls) in urban coed schools in Pune, western India, using structured questionnaire containing dichotomous and polychotomous responses for various indicators of body image perception. Anthropometric measurements were taken and BMI z-score was measured. Descriptive statistics was used and association between body image indicators, gender, and BMI was assessed using Chi-square test and One-way ANOVA. **Results:** Mean age of the respondents was 12.8 ± 0.45. The BMI z-score classification of the adolescents revealed 54% of them were underweight, 21% were overweight, and 25% had normal BMI. However, 2% considered themselves too thin, 27% considered themselves too fat, and 71% considered themselves just right. About 85% of the respondents idolized models and actors. A significant association between gender and influence of idols as a response to watching celebrities through media was observed (p ≤ 0.005). A significant association between discrimination due to physical appearance and BMI was also observed. Adolescents who followed diet had a significant association

with BMI. **Conclusions:** This study calls for targeted interventions on developing realistic body image satisfaction and self-esteem using health promoting behaviors.

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Zinc Deficiency and Inadequate Zinc Intake among Postpartum Women in Coastal Area of Makassar

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Keywords: Zinc · Postpartum women · Coastal area
Background/Aims: Zinc deficiency is common in women, which is mainly determined by adequacy of zinc intake, type of zinc ingested, and presence of inhibitors of zinc absorption. This study aimed to assess adequacy of zinc intake in postpartum women and its relationship with their serum zinc concentration. **Methods:** A cross-sectional study was conducted in three community health centers located in coastal area of Makassar, Indonesia. A total of 87 women participated in the study. A short Semi-Quantitative Food Frequency questionnaire for zinc sources was used to collect dietary data. Venous blood were drawn from all woman and serum zinc concentration was measured using Quanti Chrom Zink Assay Kit (DIZN-250). Pearson's Correlation Coeeficient was determined to investigate relationship between zinc intake, phytate intake, and serum zinc concentration. **Results:** All respondents were found to be zinc-deficient (<66 mcg/dl) and 26.4% of them had inadequate zinc intake. Average zinc intake was 15.9 mg/day with rice and legumes as the main contributors to zinc intake (54.10% and 11.33%, respectively). Average phytate intake was 6.5 gram/day that came mostly from rice and legumes (63.30% and 14.97%, respectively). A weak relationship was observed between zinc intake and serum zinc concentration as well as between phytate intake and serum zinc concentration ($r = 0.063$; $p = 0.053$ and $r = 0.150$; $p = 0.165$, respectively). **Conclusions:** Postpartum women in coastal area of Makassar were vulnerable to zinc deficiency, since their zinc sources were mainly plant products, which have low bioavailability and high phytate content.

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Fatty Acid Profile Characterization of Infant Formula in Indonesia

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Keywords: Fatty acid · Infant formula · Oil content · Oil mixture
Background/Aims: Infant formula often uses various vegetable oils as its constituent to fulfill necessary nutrient content for growth of an infant. However, studies on characterization of fatty acid composition in infant formulas sold in Indonesia are still limited. The aim of the study was to analyze the oil content, fatty acid (FA) composition, and constituents of the oil in commercial infant formulas in Indonesia. **Methods:** Stratified random sampling was carried out to identify registered infant formula products in Indonesia from the National Agency of Drug and Food Control (NADFC). **Results:** A total of 50 formulas were selected and classified according to NADFC's regulation, which consisted of 22% infant formula (0–6 months), 32% follow-up formula (6–12 month), 30% growth formula (1–3 years), and 16% special formula. Oil extraction was obtained with Folch method and the amount ranged from 5.04–24.16% (wb), which indicated significant differences among different categories of the samples ($p < 0.05$). Samples from special formula category contained lower oil content than the other categories, which showed that oil content is affected by the formula's composition. FA profile was analyzed by gas chromatography (GC) and the results did not indicate significant differences among categories in terms of total saturated, monounsaturated, and polyunsaturated FA. Predominant fatty acids in the samples were oleic acid (28.51–34.21%), palmitic acid (12.17–18.87%), and linoleic acid (15.7–17.03%). Mixed oil constituent identification was estimated by FA calculation method and principle component analysis (PCA) mapping. It resulted in 9 oil mixture patterns in the samples, which shows that commercial infant formulas sold Indonesia were predominantly consisted of mixture of soybean, palm, coconut, and sunflower oil. **Conclusions:** Infant formula sold commercially in Indonesia had varied oil content that consisted mostly of oleic, palmitic, and linolenic acid, which came from mixture of palm, coconut, soybean, and sunflower oil.

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Prevalence of Low Birth Weight (LBW) in Dhaka and Its Association with Mother's Age

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Keywords: Low birth weight · Preterm birth · Mother's age · Dhaka City
Background/Aims: Low birth weight (LBW) is a major risk factor for neonatal and infant mortality worldwide. In 2015, LBW rate was 22.6% in Bangladesh. The study was conducted to estimate the rate of low birth weight in urban Dhaka and to observe its association with mother's age. **Methods:** This was a cross- sectional study, carried out at six government and non-government hospitals in Dhaka. Birth weight, mother's age, and father's occupation of 736 babies who were born from 2014 to 2016 were taken from databases of the selected hospitals. Frequency analysis and bi-variate analysis with Chi-squared test ($\chi2$) were conducted as test of significance. Logistic regression analysis was carried out to find determinants of LBW. **Results:** The prevalence of LBW among the subjects was 30.2%. The mean birth weight of the newborn was 2.65 kg. About 16% of the mothers were adolescent (≤19 years old), 82% of them were between 20–35 years old, and only 2% were above 35 years old. Among the adolescent mothers, the LBW rate

was 41%, while among mothers aged 20 to 35 years, the rate was 28%, and among mothers aged ≥36 years, the rate was 27%. There was significant association between mother's age and birth weight (p = 0.020). A linear relationship was also found between the mother's age and birth weight of the babies. The results indicated that at least three children in every ten live births were born with LBW in urban Dhaka. Teenage mothers delivered significantly more number of babies with LBW than adult mothers. **Conclusions:** Findings of this study could help initiate preventive programs to reduce incidence of low birth weight.

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Association between Parental Feeding Practice and Clean and Healthy Lifestyle Behaviour with Stunting Status among Toodlers in West Bandung Indonesia

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Keywords: Hand washing · Parental feeding pratice · Stunting status · Toodlers
Background/Aims: The World Health Organization (WHO) states that factors for stunting is lack of nutrient intake due to poor parenting feeding practice and repeated infectious diseases that are closely related to hand-washing practice. The objective of this study was to analyze association between parental feeding practices and clean and healthy lifestyle behavior with stunting. **Methods:** This cross-sectional study included 300 toddlers (150 stunted and 150 normal) in West Bandung. Stunting status was determined by height for age z-score (HAZ). Body length and height were measured by nutritionists at local health centers. A validated questionnaire was used to interview mothers of the toddlers to observe parental feeding practices and clean and healthy lifestyle behavior. **Results:** About 22.7%, 53.3%, and 24.0% of the mothers were categorized to have poor, fair, and good parental feeding practices, respectively. Average score for the parental feeding practices was 67.86 ± 14.16 for stunted toddlers, which was significantly lower compared to that of normal toddlers (73.69 ± 13.02). There was significant association between score of parental feeding practices and stunting status (HAZ). As much as 49.7% and 42.0% of mothers of stunted and normal toddlers, respectively, had never done proper hand-washing practice before eating and after defecating. As a result, 13.3% of the stunted toddlers frequently had diarrhea, which was almost similar to the normal toddlers (12%). **Conclusions:** Parental feeding practices were associated with stunting among toddlers in West Bandung, Indonesia.

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Triacylglycerol Profile of Commercial Infant Formulas in Indonesia

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Keywords: Infant formula · Vegetable oil · Triacylglycerol
Background/Aims: Infant formula is commonly produced from cow's milk or other animal's milk and added with vegetable oil to mimic the fat content and essential fatty acids of human milk. Studies and information about fat composition in infant formula are still limited. This study aimed to analyze triacylglycerol (TAG) profile in infant formula and identify the vegetable oils used in production of the formula. **Methods:** The research was started with identification of registered infant formula in Indonesia's National Agency of Drug and Food Control (NADFC) and product sampling was performed by stratified random sampling. Fat in samples were extracted with Folch method, while TAG analysis was performed following the official method of AOCS (Ce 5b-89 2005 modified) with slight modification. Data were analyzed using ANOVA followed by Duncan's multiple range test and principle component analysis (PCA). **Results:** There were 50 samples of infant formula classified according to the NADFC food category (infant formula, follow-up formula, growing-up formula, and formulas for special medical purposes). There were no significant differences among samples in terms of their TAG content. The most common TAGs found in the samples were OOO (9.90–15.17%), POO (8.22–15.06%), POP (10.15–14.28%), OLL (7.12–9.21%), LLL (6.63–8.98%), SLL (4.95–7.74%), OLO (6.04–7.29%), LaLaP/LaMM (4.78–6.36%), LaLaM (4.45–6.19%), PLO (3.02–5.32%), PLL (2.62–4.10%), and LaLaLa (2.47–3.50%). Based on their TAG markers, commercial infant formulas sold in Indonesia were produced from mixture of palm olein, sunflower oil, soybean oil, coconut oil, canola oil, and medium chain triglyceride as their oil source. **Conclusions:** Different categories of infant formula sold in Indonesia did not affect the TAG content of the formulas significantly, with majority of TAG came from POP, OLL, and LLL, which originated from mixture of oil from palm, sunflower, soybean, coconut and canola oil.

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Stunted Toddlers Had Lower Hair Zinc Level Compared to Their Normal Peers: Result from a Case Control Study in Nganjuk

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Keywords: Short stature · Stunting · Zinc level · Hair · Biomarker
Background/Aims: One of the hindrances in using full potential of the developing nation's human resources is high prevalence of child stunting. Currently, stunting is measured using anthropo-

metric measurement that deemed by some as a late indicator of growth failure. This study aimed to analyze the difference in hair zinc level of stunted toddlers as compared to normal toddlers. **Methods:** This case-control study was conducted in Nganjuk with 23 stunted toddlers and 23 normal toddlers selected using simple random sampling technique. Body height was measured using sta-diometer and stunting was defined as <-2 height-for-age z-score, while hair zinc level was measured using atomic absorption spec-trometry conducted at the Center of Research and Industrial Con-sultation Laboratory, Surabaya. Data collected were analyzed by Chi-squared test. **Results:** The study revealed that mean hair zinc level among stunted toddlers were 146.21 ± 16.83 ppm, while the hair zinc level among the normal toddlers were 157.07 ± 23.11 ppm. The Chi-squared test showed significant association between height and hair zinc content (p = 0.039). There was significant dif-ference in hair zinc level between stunted toddlers as compared to their normal peers. **Conclusions:** Program for detection of stunt-ing should consider using hair zinc level as bio marker for early detection as it is not invasive.

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Body Fat and BMI Percentile Curves for Japanese Adolescents

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Keywords: Body fat percentile curves · BMI percentile curves · Adolescents

Background/Aims: The aim of this study was to establish age- and gender-specific body fat percentile curves and BMI percentile curves for Japanese adolescents. **Methods:** The total subjects of this study were 2,879 students (1,435 boys and 1,444 girls) aged 12–17 years old. Data were collected at junior high school and se-nior high school in Tokyo every April from 2001 to 2017 when physical examinations were conducted. Height was measured to the nearest 0.1 cm using stature mater. Weight and body fat were measured by bioelectrical impedance analysis (InBody, InBody Ja-pan). The average height and weight were compared with the aver-age of Japanese children. Percentile curves for BMI and body fat percentage were constructed for boys and girls separately using the LMS method. **Results:** The total number of data was 7,482 in boys and 7,125 in girls. The BMI and body fat percentile curves for Jap-anese children aged 12–17 were established. Although there were no gender specific differences in BMI percentile curves, there were gender specific differences in body fat percentile curves. Fifty per-cent of boys changed their body fat composition from 17.1% at the age of 12 to 13.1% at the age of 14 and afterwards it stayed stable. However, 50% of girls had 21.9% of body fat at the age of 12 and it increased up to 25.8% by the age of 17. Body fat percentile curves for Japanese adolescents were different from those reported in studies conducted at European countries, but similar changes were noted in Hong Kong children. **Conclusions:** BMI and body fat per-centile curves for Japanese children aged 12–17 were successfully established in this study.

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Nutrition, Inflammation and Preeclampsia: Focus on Antioxidant-Vitamins Intake

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Keywords: Antioxidant-vitamins · Inflammation · Preeclamp-sia

Background/Aims: Dietary antioxidants intake, i.e. vitamin A, C, and E, and CoQ10, is still controversial on its impact in reduc-ing the risk of preeclampsia. This preliminary study aimed to ex-plore antioxidant-vitamins intake, Il-6 as inflammation biomark-er, and plasma CoQ10 as antioxidant level in relation to pre-eclampsia. **Methods:** Thirty-one pregnant women were recruited consecutively from two hospitals in Jakarta, Indonesia, with 20 preeclampsia and 11 normal pregnant women. **Results:** Pre-eclampsia pregnant women tended to be obese but they had lower energy intake. The intakes of vitamin A, C and E were higher among preeclampsia women; however, the level of IL-6 was high-er among them as compared to those having normal pregnancy. Although not significantly different, the level of plasma CoQ10 was higher among the preeclampsia women. **Conclusions:** Further study is needed to explore the relationship between dietary anti-oxidants and anti-inflammation nutrients in the pathology of pre-eclampsia.

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Factors Associated with Stunting in Children Aged 0–24 Months: Studies in Sukaluyu, Karawang, Indonesia (Citarum Project)

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Keywords: Citarum · Stunting · Under two children

Background/Aims: Early life period (0–24 months old) is a golden period of growth and development that determines the quality of health later in life. Double malnutrition, including stunt-ing, at this period will inhibit growth and development as well as increase the risk of non-communicable diseases (NCDs) later in life. This study was aimed to analyze prevalence and factors associ-ated with stunting in children aged 0–24 months old in Sukaluyu, Karawang, Indonesia (Citarum Project). **Methods:** A cross sec-tional study was conducted in 130 children aged 0–24 months from October to November 2018 in Sukaluyu village, Karawang district, Indonesia (sector 17 of the *Citarum Harum* project). Data were collected by questionnaire and anthropometric assessment. Pearson's correlation test was used to analyze association between birth weight, early initiation of breastfeeding, breast milk, and hy-giene and healthy lifestyle. **Results:** Prevalence of stunting (length/ height for age z-scores < –2.0) among children was 20% (male 58%, female 42%). Factor associated with stunting among subjects was

breast milk (p < 0.05), meanwhile no association was seen from birth weight, early breastfeeding initiation, and hygiene and healthy lifestyle. **Conclusions:** Stunting could be prevented through exclusive breastfeeding (until 6 months old) and continued for up to 2 years by giving complementary feeding.

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Nutrition and Health Challenges For Infants and Children in Indonesia

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Keywords: Infants · Children · Stunting · Overweight · Anemia · Complementary foods
Background/Aims: For Indonesia, double burden of malnutrition is a major public health challenge. A literature review was conducted to investigate current nutrition and health situation among Indonesian children aged 0–6 years old. **Methods:** Using a dedicated structured review methodology (NutriPlanet), PubMed, Medline, CAB, and Embase libraries were used to search for relevant literature from 1996 to 2018. Additional articles from local journals and non-indexed nationwide reports were also included, along with six key opinion leader interviews to verify findings and bring conclusions into perspective. **Results:** The 2018 Basic Health Research or *Riskesdas* revealed that the flat stunting rate (36–38%) over 2007–2013 had decreased to 30.8% in 2018, with a notable reduction in severe stunting. Prevalence of overweight among children under five decreased from 12% to 8%, partly linked to decrease in stunting, as most overweight young children were also stunted. Anemia prevalence was high (>50%) at age 0.5–2 years old and moderate (10–16%) at age 2–5 years. Vitamin A deficiency was no longer an issue due to successful supplementation programs. Vitamin D deficiency was found in >30% of young children. Protein intake at the higher end of the distribution, with an intake of more than 300% of the recommendation brought an increasing concern. Fat quality was also a concern since n-3 fatty acid intake was below recommendation in >80% of the children. Information on added sugar in the diet of young children was missing. **Conclusions:** Indonesia has made significant progress in recent years, but stunting, anemia, and complementary feeding should remain as focus of improvement.

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Association between Maternal Overweight and Obesity with Offspring Neurodevelopment: Findings from Pregnancy Cohort Study Universiti Sains Malaysia

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Keywords: Maternal obesity · Pre-pregnancy body mass index · Neurodevelopment scores · Offspring
Background/Aims: Higher maternal body mass index (BMI) has been associated with poorer cognitive performance in the offspring. This study aimed to determine whether maternal pre-pregnancy overweight and obesity was associated with neurodevelopmental delays in Asian children aged 2–3 years. **Methods:** A total of 124 mother-child pairs from the Universiti Sains Malaysia (USM) Pregnancy Cohort Study were included in the analysis. Pre-pregnancy BMI was computed from self-reported weight in the first trimester (kg)/measured height (m^2) and classified according to the World Health Organization (WHO) cut-offs. The Ages and Stages Questionnaire, Third Edition (ASQ-3) was used to assess the children's developmental milestones, based on subscales of communication, gross motor, fine motor, problem solving, and personal social scores. Multivariate logistic regression model was used to investigate association of pre-pregnancy BMI on children with ASQ scores, with adjustment for potential confounders. **Results:** There were 26.6% women who were overweight and obese before pregnancy. Among the five ASQ-3 subscales assessed, only gross motor was found to be associated with pre-pregnancy BMI. Overweight and obese mothers were significantly more likely to have children with higher gross motor scores compared to mothers of normal BMI (OR: 7.645, CI: 2.080–28.091, p = 0.002). The present findings were inconsistent with existing literature from Western countries. This could be due to the uniqueness of the Asian population. **Conclusions:** More studies to explore association in the Asian context.

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A Comparison of Iron Absorption and Status in Normal Weight and Overweight/Obese Pregnant Thai Women

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Keywords: Iron absorption · Overweight · Pregnant women · Hepcidin

Background/Aims: Obesity is a state of low-grade chronic inflammation which leads to elevated hepcidin concentrations. During pregnancy, this may impair iron absorption and status of the mothers. This study aimed to compare iron absorption and status during pregnancy between normal weight and overweight/obese Thai women. **Methods:** Two test meals containing iron isotopes, 57^{Fe} and 58^{Fe} as ferrous sulfate, were provided to all eligible pregnant women at their 2nd and 3rd trimester. Blood samples were collected before and 14 days after each test meal administration for iron absorption and status and inflammation analyses using mass spectrometry. **Results:** Six normal weight and six overweight/obese pregnant women participated in the study. Mean age was 29.7 ± 5 years in normal weight group and 30.5 ± 5 years in overweight/obese group. Baseline weight and body mass index of overweight/obese mothers were significantly higher (82.6 kg and 32.5 kg/m^2) when compared to normal weight mothers (53.0 kg and 22.5 kg/m^2) ($p < 0.01$). Other baseline characteristics of participants were comparable. Serum ferritin concentration decreased during pregnancy, while an increase in serum transferrin receptor was observed in both groups. In normal weight women, hepcidin concentration at 36 weeks (4.1 ng/ml) was significantly reduced when compared to baseline (8.6 ng/ml) ($p < 0.05$). Higher iron absorption at both 2nd and 3rd trimester was found in normal weight mothers, but the difference was not statistically significant ($p > 0.05$). **Conclusions:** Inappropriate weight before and during pregnancy induced low-grade inflammation and impaired iron absorption in pregnant Thai women. Therefore, intensive counselling on weight control before and during pregnancy is necessary.

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Factors Associated With Child Feeding among Children 0–23 Months: Analysis of The 2012 and 2017 Indonesian Demographic Health Surveys

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Keywords: Breastfeeding · Dietary diversity · Animal source food · Child feeding · Indonesia

Background/Aims: Child feeding practice in Indonesia needs improvement. This study aims to assess factors associated with age-inappropriate breastfeeding, dietary diversity and consumption of animal source foods (ASF) in Indonesia. **Methods:** Data from 11.687 last born children age 0–23 months from the Indonesian Demographic Health Survey 2012 and 2017 were analyzed using regression and logistic regression adjusting for complex sampling design. Factors assessed included child's, demographic, household, health care and women's empowerment factors. **Results:** Child's age and quality of antenatal care (ANC) were associated with all outcomes. Socio-economic status and labour-force participation were positively associated with dietary diversity score and ASF consumption but negatively associated with age-appropriate breastfeeding. More ANC visits and having consultation at ANC were associated with more dietary diversity. Good women's educational and knowledge level was associated with more dietary diversity and a greater odds of consuming ASF. **Conclusion:** Nutrition programs need to focus on improving child dietary diversity and ASF in poorer households and on prolonging breastfeeding in richer households. Women's labour force participation should be encouraged, but programs to support prolonged breastfeeding and breast pumping for working mothers need to be pursued. The quality of ANC and postnatal programs need improved consultation sessions for child feeding.

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Breakfast Dietary Patterns, Energy and Protein Among Philippines Families with Children

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Keywords: Philippines · Breakfast dietary patterns · Child nutrition · Protein

Background/Aims: The WHO recommends that adequate intake of energy, protein, and other nutrients, is essential in child-

hood. Protein, in particular, is critical for physical and mental development, serving an important role in child growth. During childhood, food provided at home has a significant impact on the diet. Breakfast, in particular, is associated with physical and cognitive function, and with the risk of future obesity. **Methods:** We studied on breakfast patterns of 226 Philippines families who would have nutritional problems in children by cluster analysis, using our company's dietary survey, to elucidate the characteristics of nutritional intake. **Results:** The breakfast types were classified into the following seven patterns: bread 24.0%, traditional 25.5%, light meal 14.3%, vegetable 3.5%, processed food 2.5%, high fat 17.8%, and noodle 12.1% according to the nutritional characteristics. The average fulfillment rate of one-third of RENI (Recommended energy and nutrient intakes, Philippines 2015) in the bread and light meal patterns were 66% and 53% of the energy, and 69% and 41% of the protein, respectively. Bread and light meal pattern made up more than 40% of the breakfasts in the Philippines and 60% in Manila. These findings demonstrate the presence of energy and protein deficient breakfast patterns in the Philippines. **Conclusion:** The present findings highlight the need for proposing improvements to children's dietary habits. The addition of proteins and other nutrients to supplement the observed breakfast patterns will promote healthy growth of their children.

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Recommended Gestational Weight Gain For Thai Pregnant Women

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Keywords: Thai pregnant women · Gestational weight gain · Recommendation · Pre-pregnancy BMI

Background/Aims: Weight gain during pregnancy was monitored in the antenatal care services, using recommended gestational weight gain (GWG) based on either Vallop curve (to prevent low birthweight) or the US Institute of Medicine (IOM) recommended GWG. There is a need for GWG recommendation for Thai pregnant women to prevent both under- and overnutrition. The study aimed to improve recommended GWG appropriate for Thai pregnant women with varying pre-pregnancy nutritional status (by body mass index, BMI). **Methods:** GWG data of 620 women who delivered infants with normal birthweight at Siriraj hospital were analyzed using multilevel mixed analysis to generate the GWG curves. Preliminary validity test of the GWG curves was performed with the data of 40 women having normal and overweight/obese pre-pregnancy BMI. Subsequently, the curves were tested again with the data of 360 women. **Results:** Recommended GWG for pregnant women with underweight and normal pre-pregnancy BMI were in the similar range as the US IOM recommendation and identified higher proportion of pregnant women who had optimal birthweight compared to the previous study. The ranges of

recommended GWG for women with overweight or obese pre-pregnancy BMI were higher and larger in intervals. Differences in these latter groups could be due to the different pre-pregnancy BMI cutoffs used to define overweight and obese status between Thai and US recommendations. **Conclusion:** The developed GWG curves are valid for Thai pregnant women who had underweight or normal pre-pregnancy BMI. Additional data are needed to verify the recommended GWG for women with overweight and obese pre-pregnancy BMI.

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Associations between Sleep Habits, Body Mass Index and Cognitive Function among Adolescents Aged 10–14 Years in Selangor, Malaysia

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Keywords: Sleep habits · Body mass index · Cognitive function

Background/Aims: While the relationship between poor sleep habits has been linked to overweight and obesity, much less research has been done relating sleep habits with cognition in children and adolescents. Hence, this study aimed to determine the associations between sleep habits, BMI-for-age and cognitive function among adolescents in Selangor, Malaysia. **Methods:** A total of 218 adolescents aged 10–14 years participated in this cross-sectional study. Body weight and height of the respondents were measured, and BMI-for-age was calculated. Sleep habits and cognitive function (Full IQ) were assessed using the Children's Sleep Habits Questionnaire (CSHQ) and Wechsler's Intelligence Scale for Children (WISC-IV). **Results:** A total of 17.4% of the adolescents were overweight and 11.5% were obese. Less than one third (26.1%) of the adolescents meet the recommended sleep duration of 9–11 hours per day. The mean sleep duration, bedtime and waking time were 7.96 ± 1.18 hours per day, 10.27 ± 3.14 PM and 6:26 ± 1:17 AM respectively. Sleep-disordered breathing (t = 3.988; p < 0.001) was found to be significantly different between male and female adolescents. A negative relationship was found between bedtime resistance (r = –0.136; p = 0.045) and sleep anxiety (r = –0.135; p = 0.047) with BMI. Similarly, a negative relationship was found between bedtime resistance (r = –0.169; p = 0.012) and sleep disorder score (r = –0.146; p = 0.031) with Full IQ. **Conclusion:** These data suggests that sleep disorder is associated with increased BMI and poorer cognitive scores. This indicates the importance of good sleep habits for better weight management and cognitive performance among adolescents. Further studies are needed to better understand the underlying mechanism of these relationships.

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Nutritional Status of Pregnant Women in The Northern Area of Taiwan

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Keywords: Nutritional deficiency · Pregnancy · Northern area of Taiwan

Background/Aims: Appropriate maternal nutritional status is vital to prevent pregnancy complications and supports the normal fetal development. Nutritional deficiency is linked to increased maternal morbidity and fetal death. Therefore, the objective of this study was to evaluate the serum nutritional status including iron, folate, vitamin D and vitamin B12 among pregnant women in the northern area of Taiwan. **Methods:** This study was conducted by analyzing the northern area of the subjects from the 2017 to 2019 nationwide Nutrition and Health Survey among pregnant women in Taiwan. 496 pregnant women aged 20-≦45 years who took the prenatal care at medical facility were recruited. Anthropometry, blood biochemistry, food frequency questionnaire and 24-hour dietary recall data were collected. The results were analyzed using one way analysis of variance (ANOVA) and chi-square test via SPSS version 21. **Results:** The prevalence of iron deficiency, vitamin D deficiency, vitamin B12 deficiency and folate depletion were 37.6%, 38.4%, 22.0% and 9.9%, respectively. The use of nutritional supplements such as multivitamin/mineral and iron significantly increased as the pregnancy progressed (both p < 0.05). However, the prevalence of iron deficiency, vitamin B12 deficiency and folate depletion all significantly increased, while the vitamin D deficiency significantly decreased as the trimester progressed (all p < 0.05). **Conclusion:** Our result revealed that the pregnant women in the northern area of Taiwan still had insufficiency iron, vitamin D, vitamin B12 and folate status, especially when the pregnancy progressed.

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Effect Evaluation of Comprehensive Salt Reduction Measures For City-Pupils in China

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Keywords: Pupils · Salt reduction · Salt consumption

Background/Aims: To evaluate salt reduction measures and compare the changes of students and parents' knowledge of salt and snack consumption before and after the intervention. **Methods:** There public elementary schools were selected from each of Beijing and Huanggang, which were divided into control group and intervention group, and stratified sample survey was conducted with three to five grade pupils among them. There are 1129 pupils and 1085 parents were investigated before the experiment, and 1124 pupils and 1112 parents were investigated after the experiment. Taking measures to reduce salt intake from three aspects of schools, pupils and parents, and filling out the questionnaire. Data analysis using SPSS19.0. **Results:** After the experiment, the average salt consumption of experimental school canteens dropped from 1.52 g/person day to 0.96 g/person day, the score of pupils' knowledge of salt intake rose from 3.75 to 5.54 (out of 10), and the score of parents' knowledge of salt intake increased from 4.25 to 5.52 (out of 10), other parts' changes of the awareness of salt and snack knowledge also had statistical differences (p < 0.05), but related behavior changes had no statistical differences (p > 0.05). **Conclusion:** Through the method of health education and publicity, students and parents' awareness of salt and snack-related knowledge can be raised.

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Nutritional Status and Food Consumption Pattern of Toddler in Coastal Areas of East Nusa Tenggara

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Keywords: Coastal area · East Nusa Tenggara · Food pattern · Toddler nutritional status

Background/Aims: East Nusa Tenggara (NTT) is one of provinces in Indonesia which have a higher prevalence of malnutrition, especially stunting among children under five years. The objective of this study was to analyze the nutritional status and food consumption patterns of Toodler in coastal areas of NTT. **Methods:** This study applied a cross-sectional study design for 68 toddlers aged 6–36 months from three districts of coastal areas of NTT (Nagekeo, Lembata, and Sikka). The nutrition status of toddler was analyzed based WHO standard using parameters W/A (underweight), H/A (stunting), and W/H (wasting). The food pattern data was collected by interviewing mothers of the toddlers on breasfeeding, complementary feeding, and food frequently consumed by toddlers (carbohydrate foods, plant protein foods, animal protein foods, vegetables, fruits, and beverages). **Results:** The results showed that the prevalence of underweight, stunting, and wasting was 23.5%, 44.1%, 19.1%, respectively. There is no obese toddler in this study area, and there is no different of the malnutrition problem among boys and girls. As many as 68.1% of toddler were exclusively breastfeed up till six months of age. Only 46.8% and 40.4% of infants 6–9 months and 9–12 months given a complete complementary food, respectively. More than three-fourth (74.5%) of children 1–3 years old given a varied diet. There was a significant association (r = 0.305, p < 0.05) between diet diversity score and wasting toddlers that the lower diet diversity score, the higher wasting. **Conclusion:** This implies the important of improving diet of toddlers for alleviating malnutrition in this coastal area.

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The Effect of Gestational Weight Gain on Initiation and Duration of Breastfeeding: A Prospective Study in China

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Keywords: Gestational weight gain · Breastfeeding
Background/Aims: The study aimed to explore the effect of gestational weight gain (GWG) on initiation and duration of breastfeeding. **Methods:** A population-based prospective study was conducted among pregnant women during the first trimester from March to July 2017 in Chengdu of China. Basic information were collected by questionnaire when they enrolled. Body weight was measured before delivery, while gestational weight gain was calculated and assessed by IOM criteria (2009). Breastfeeding information were collected at 3 and 42 days postpartum through follow-up, respectively. Multiple ordinal and non-conditional logistic regression models were performed to explore the effect of GWG on the initiation and duration of breastfeeding, respectively. A total of 1068 pregnant women were included eventually. **Results:** The prevalence of excessive GWG was 24.5%. The percentage of delayed initiation of breastfeeding was 4.9% while the rate of breastfeeding at 42 days postpartum was 94.8%. The excessive GWG group had a higher risk of delayed initiation of breastfeeding (OR: 1.42, 95% CI: 1.05~1.93) adjusted for potential confounders, when compared with adequate GWG group. The excessive GWG group among normal weight women had a greater risk of inability to sustain breastfeeding at 42 days postpartum (OR: 2.71, 95% CI: 1.07~6.87) adjusted for potential confounders, when compared with adequate GWG group among normal weight women. **Conclusion:** The study indicated that GWG had an effect on initiation and duration of breastfeeding. Excessive GWG would increase the risk of delayed initiation and early termination of breastfeeding in Chinese women.

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Human Milk Microbial Diversity and Community Development during Lactation: An Ecological Succession Influenced by Maternal Diet and Gestational Blood Pressure

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Keywords: Human breast milk · Milk microbiome · Maternal diet · Gestational blood pressure
Background/Aims: Recent evidence showed that bacteria in the breast milk can directly seed the infant intestinal microbiota. However, little information is available relating to the impact of maternal factors on the breast milk microbiota. Therefore, we used high-throughput sequencing to characterize bacterial composition in human breast milk samples collected at the first day (colostrum), 2 weeks (transitional milk), 6 weeks (mature milk) and 4 months (mature milk) postpartum in 117 longitudinally followed mothers, for whom dietary, clinical and health data were collected. We found that human milk microbial diversity changed before maturation, while remaining relatively stable in mature milk samples. This ecological session was significantly influenced by maternal geography and diet. Maternal intakes of fruits, vegetables and soybean products were positively associated with abundance of beneficial species including B. saeculare, B. pseudolongum and L. amylovorus in colostrum samples. Breast milk samples from normotensive mothers tented to be more diverse and contain more favorable genera than those from mothers with gestational prehypertension. In addition, the breast milk epidermal growth factor, known to be critical to the development of the infant's intestine, were in positive association with Lactobacillus and Bacteroides abundance during lactation. The findings of our study underscored the importance of maternal diet and gestational blood pressure for breast milk microbial diversity and community development as well as interaction between microbial profiles and bioactive compounds contained in breast milk, which might have important consequences for the establishment of the infant's intestinal microbiota and systemic health in later life.

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Exploration of Specific Nutritional Deficits in Very Low Birth Weight Infants with Extrauterine Growth Restriction

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Keywords: VLBWIs EUGR nutritional deficits
Background/Aims: Inadequate nutrition intake is the main cause of extrauterine growth restriction(EUGR) in very low birth weight infants(VLBWIs). **Methods:** We conducted this research to evaluate the energy and three major nutrients deficits in VLBWIs. A total of 92 VLBWIs were enrolled and divided into an EUGR group(n = 61) and a non-EUGR group(n = 31). Actual nutrition intakes were daily collected. Growth parameters were daily measured.EUGR was defined as weight <10th percentile based on the Fenton 2013 growth chart. Nutritional deficits were calculated according to European Society for Paediatric Gastroenterology, Hepatology and Nutrition(ESPGHAN) guidelines. Growth restriction was 18.5% at birth and 66.3% at discharge. **Results:** Compared with ESPGHAN guidelines, the EN was started late (6.0 ± 3.9 days), the EN interruption time in EUGR group was longer than non-EUGR group(7.0 ± 9.2 days vs 1.7 ± 1.8 days, p = 0). The enteral energy and three major nutrients intakes were lower in EUGR group at different postnatal age(p = 0). The total energy intake reached the recommendation in the third week in non-EUGR group, while kept under recommendation in EUGR group. Protein recommendation criteria were not met in either group. Both

groups reached the recommended glucose and lipid intakes in the early stage. By the end of the tenth week, the cumulative energy deficits were –653.8 kcal/kg/d in non-EUGR group and –2014.8 kcal/kg/d in EUGR group(p = 0). The cumulative protein deficits were –64.3 g/kg/d and –69.6 g/kg/d respectively(p = 0.43). Longer interruption of EN time (OR 1.372, 95% CI 1.117–1.684, p = 0.003), lower intake of enteral(OR 0.648, 95% CI 0.455–0.921, p = 0.016) and total lipid (OR 0.702, 95% CI 0.671–0.733, p = 0) were found to be associated with a higher incidence of EUGR. **Conclusion:** The energy intake in the EUGR group was significantly insufficient.Inadequate EN intake aggravated the occurrence of EUGR. Insufficient protein intake was prevalent in VLB-WIs.

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The Effects of Lipid Profiles During Pregnancy on The Risk of Gestational Diabetes Mellitus: A Prospective Study

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Keywords: Gestational diabetes mellitus · Lipid profiles · Pregnancy

Background/Aims: The study aimed to explore the effects of lipid profiles in the first and second trimester on the risk of gestational diabetes mellitus (GDM) in Chinese women. A prospective study was conducted among 1700 healthy singleton pregnant women from Chengdu who were in the first trimester of pregnancy from March to July 2017. **Methods:** Data of diet, physical activity and demographic information were collected through questionnaire in the first trimester. Concentrations of triglyceride (TG), total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C) and high-density lipoprotein cholesterol (HDL-C) were measured at (12 ± 1) week and (24 ± 1) week respectively. GDM was diagnosed according to the IADPSG criteria. Multiple non-conditional logistic regression models were used to examine the association between lipid profiles and GDM. Finally, a total of 1458 pregnant women were analyzed. **Results:** After adjusting for age, pre-pregnancy BMI, gravidity, parity, history of GDM, family history of diabetes, energy intake and level of physical activity, the logistic regression models showed that TG levels in first and second trimester were positively correlated with the risk of GDM (OR = 1.550, 95% CI: 1.219–1.970; OR = 1.331, 95% CI: 1.125–1.574); TC and LDL-C levels in the first trimester were positively correlated with the risk of GDM (OR = 1.257, 95% CI: 1.051–1.503; OR = 1.271, 95% CI: 1.003–1.609). No correlation was found between TC, LDL-C, HDL-C levels in the second trimester and GDM. **Conclusion:** Increased level of TG, TC, LDL-C in the first trimester and TG in the second trimester may be risk factors of GDM.

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Factors of Diet and Dietary Environment in Dietary Education of Parents and Preschool Children: Qualitative Research with Focus Group Interviews

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Keywords: Preschool children · Parent · Dietary education · Qualitative study

Background/Aims: This study explored the factors of diet and dietary environment related to support of dietary education suitable for parents and preschool children. **Methods:** We conducted and recorded two groups interviews of 12 mothers who had preschool children. The transcripts were analyzed using the KJ method, and concepts from "Supported for dietary education" related to diet and dietary environment including were extracted categorized. **Results:** The results showed that "Supported for dietary education" was divided into " Dietary attitude for children " and "Place of dietary education". "Dietary attitude for children" was divides into 5 subcategories of "Devices for children's meals at home", "Relationship with children's meals", "Children's interest in meals", "Dietary education at home" and "Dietary education outside home". "Problems of children's meals" and "Parents 'anxiety about children's diet" were extracted from "Relations with children's diet" as two factors that dietary education does not go well. Between "Relationship with children's meals" and "Children's interest in meals" recognized a reciprocal relationship. On the other hand, "Place of dietary education" was divided into "Eating out", "Dietary education at home" and "Dietary education outside home". **Conclusion:** Parents with a preschool children in Japan were active in dietary education, but diet and dietary environment has common problems relating to dietary education. Therefore, it was suggested diet and dietary environment that was necessary to support dietary education while giving children interest in diet according to the age of the children.

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Overweight Prevalence and Lifestyle Trends in Children Aged 5 Years in Southern Vietnam: Estimates From 2012 to 2018

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Keywords: Vietnam · Child-overwright · Lifestyle

Background/Aims: Although child-overweight has been increasing in urban area, few studies conducted in provincial cities. The study aimed to assess trends in nutritional status, lifestyle and family background of pre-school children in provincial city over

the period 2012 to 2018. **Methods:** Two cross-sectional studies were conducted in Long Xuyen city, An Giang Province. All the 5 year old class children belong to 10 public kindergarten (2012/n = 1857, 2018/n = 1426), measured height and weight, and classified as normal, underweight, stunting and overweight according to WHO Anthro Plus program (version1.0.4.). Then total of 433 and 444 children from overweight and normal group were selected in each year. Their lifestyle and family back ground data were derived from self-administrated questionnaires to the parent. Statistical analysis was carrying out with SPSS (version16.0 for Windows). **Results:** Trends analysis found overweight increased from 11.1% to 20.9%, and underweight and stunting were decreased from 9.0% to 4.6% and from 8.8% to 6.5% respectively. The proportion of children who play computer game increased from 42.6% to 71.2%, lower family income decreased 68.4% to 41.2%. There was a significant association between overweight and some lifestyle and family background factors were observed in 2012. However, only overweight father were associated with overweight in 2018. **Conclusion:** Prevalence of overweight doubled and spread to lower income families. Although spend time to play computer game was increased, no significant association between nutritional status and lifestyle factors. Social environment is rapidly changing, so continual studies on child lifestyle are needed to prevent overweight.

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Factors Associated with Dental Caries in Primary Teeth among Malaysian Pre-Schoolers

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Keywords: Dental caries · Primary dentition · Pre-schoolers · Feeding practices · Second-hand smoke

Background/Aims: Dental caries in primary teeth is prevalent among children in developing countries. A cross-sectional study was conducted to determine the factors associated with dental caries in primary teeth among 396 pre-schoolers aged 3 to 6 years old in 26 governmental pre-schools in Negeri Sembilan, Malaysia. **Methods:** Dental examination was conducted by a dentist to record the amount of decayed and filled primary teeth (dft), whereas height and weight of the pre-schoolers were measured by the researchers. Information regarding socioeconomic characteristics, feeding practices, second-hand smoke exposure and birth weight was gathered through a self-administered questionnaire answered by the mothers. **Results:** Nearly two-third of the pre-schoolers (64.4%; mean±SD dft = 3.66 ± 4.61) had dental caries in primary teeth, in which higher proportion of boys (69.4%) had dental caries than girls (59.5%). Among them, there was 14.8% of pre-schoolers was overweight and obese while 11.8% and 6.9% of pre-schoolers was underweight and stunted, respectively. In multiple logistic regression analysis, pre-schoolers who were Chinese (AOR:3.18,

95% CI:1.046–9.652), had household income RM4000 and above (AOR:5.218, 95% CI:1.392–19.557), slept with bottle in mouth (AOR:3.94, 95% CI:1.236–12.546), had family members smoked at least 1 cigarette per day inside the house (AOR:2.36, 95% CI:1.217–4.565) had higher odds of dental caries in primary teeth. **Conclusion:** Dental health promotion is needed to educate parents on appropriate feeding practices and disadvantages of smoking in reducing the risk of dental caries among pre-schoolers.

Poster Presentation

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Indonesian-Adapted AHEI-P and Minimum Dietary Diversity of Madurese Pregnant Women

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Keywords: Dietary diversity · Pregnant women · Diet quality · AHEI-P

Background/Aims: Pregnant women are vulnerable to malnutrition. Low dietary quality can affect nutritional status of mothers and fetus. Pregnant women have a high risk of micronutrient defiency due to their diet. There are many methods to measure dietary quality. This study aimed to assess diet quality of pregnant women using Indonesian-Adapted Alternate-Healthy Eating Index-Pregnancy (AHEI-P) and Minimum Dietary Diversity for Women of Reproductive Age (MDD-W). **Method:** This experiment was conducted as a cross sectional study that involved 193 pregnant women aged 18–49 years old in Sumenep regency, Madura island, Indonesia. MDD-W was calculated based on a set of ten food groups. Pearson test was used to analyze the correlation between AHEI-P and MDDW. **Results:** Based on Indonesian-adapted AHEI-P, 65.8% of the respondents needed to improve their diet. Meanwhile, 58% of them had a diversed diet (consumed ≥5 types of food group). There was a significant correlation between AHEI-P and MDD-W (p < 0.01). The score of MDD-W had a siginificant corelation (p < 0.01) with fiber intake, micronutrient intake, and micronutrient adequacy (vitamin A, vitamin C, calcium, magnesium, and iron). **Conclusions:** Majority of pregnant women need improvement in their dietary quality, especially for micronutrient intake. MDD-W could be considered as an effective and easy tool for assessing the quality of diet during pregnancy.

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Pregnancy Screenings are Cost-Effective in Detecting Adolescent Pregnancy Complications

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Keywords: Pregnancy complication · Pregnancy outcome · Pregnancy screening · Cost-effectiveness

Background/Aims: The purpose of the study was to examine incidences of adolescent pregnancy complications (e.g. pregnancy diabetes, pregnancy-induced hypertension, etc.) during perinatal periods and to estimate cost-effectiveness of pregnancy screenings based on family income. **Methods:** A retrospective study was conducted in an affiliated hospital in Wenzhou from January to March in 2000 to 2018. A bivariate logistic regression model was used to analyze association between incidences relating to pregnancy complications and their pregnancy status. Furthermore, a cost-effectiveness model was used to explore association between pregnancy screening expenses and their pregnancy outcome. A total of 16263 single-birth adolescent women were investigated in the survey. **Results:** There was an increasing portion of older pregnant women in recent years. Correspondingly, adverse incidences of pregnancy complications such as pregnancy diabetes (r = 0.648, p < 0.05), pregnancy-induced hypertension (r = 0.521, p < 0.05), cholestasis syndrome (r = 0.315, p < 0.05), placental abruption (r = 0.351, p < 0.05) , and puerperal infection (r = 0.712, p < 0.05) among older pregnant womenl had significant associations with the late pregnancy status. It was also found that relevant expenses of pregnancy screening during perinatal period were cost-effective, especially for those with less than 8000 Yuan family income per month. **Conclusions:** Older pregnant women have significantly high risks of pregnancy complications. Pregnancy screenings are cost-effective for early detection of adverse complications, especially for families with low-income families.

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Antiemetic Activity of Milk Added with Microencapsulated Propolis from *Trigona itama* in Bintan, Riau

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Keywords: Antiemetic · Propolis · Trigona Itama

Background/Aims: Nausea and vomiting or emesis is common condition that occurs during pregnancy. If this condition occurs excessively, it can be harmful to the health of mother and fetus. A functional food that can be used as antiemetic is propolis. Propolis is a resinous compound collected by bees from plants and it is used for construction of honeycomb. Some other functions of propolis are antibacterial, anticancer, immunomodulatory, anti-inflammatory, antiviral, and antioxidant properties. The present study aimed to determine the antiemetic activity of milk for pregnant women with addition of microencapsulated propolis from stingless bee (*Trigona itama*). **Methods:** Propolis from *Trigona itama* was extracted with water using ultrasound technology. Microencapsulation technique was conducted by spray drying method. The formulation of propolis milk was based on the regulation of Indonesia National Agency of Drug and Food Control Number 33 Year 2013, which must contain no less than 325 kcal per 100 g and 18–25 g protein per 100 g. Antiemetic activity was observed on copper sulfate–induced emesis in young chicks. **Results:** Milk with propolis from *Trigona itama* had antiemetic activity. **Conclusions:** Propolis extract from *Trigona itama,* which has been microencapsulated and formulated with milk for pregnant women, showed antiemetic activity. Thus, propolis milk could be an alternative solution for pregnant women in reducing symptoms of nausea and vomiting during pregnancy.

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Maternal Anthropometric Profile and Body Fat Changes in First 4 Months of Breastfeeding Period

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Keywords: Breastfeeding · Anthropometric profile · Body fat

Background/aims: Studies found that natural loss of body weight is one of the benefits of breastfeeding for mothers. Previous studies showed a significant reduction in body fat among lactating mothers in the 4 to 6 months after delivery, but similar change did not occur with body mass index (BMI). Unfortunately, the assessment this assessment was not performed from the beginning of breastfeeding period. Several studies also showed that there were varied factors that affected weight loss. This study aimed to describe changes in anthropometric profile (body weight, height, MUAC) and body fat percentage of lactating mothers from childbirth to 4 months after in the working area of Genuk Integrated Health Service, Semarang, Central Java, Indonesia. **Methods:** Interview on general characteristics, breastfeeding exclusivity, and anthropometric and body fat percentage measurements were carried out with 30 lactating mothers. Measurements were carried out every month during the study. **Results:** There was decrease in body weight, BMI, and MUAC with 1.27 ± 0.29 kg, 0.5 ± 0.87 kg/m^2, and 0.09 ± 0.02 cm, respectively; although they were statistically insignificant. Conversely, there was an increase in body fat percentage during breastfeeding, though it was not significant (0.65 ± 3.33%). These changes were not influenced by differences in breastfeeding practices, i.e. exclusive breastfeeding, even though all respondents were still breastfeeding. **Conclusions:** Breastfeeding practices tend to reduce BMI, but not body fat percentage at the first of 4 months of lactation period.

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Factor Related With Stunting: An Observational Study on Infants Under Two Years in Working Area of Sungai Malang Integrated Health Service, Hulu Sungai Utara District

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Keywords: Stunting · Family's income · Mother's job

Background/Aims: Stunting, according to the World Health Organization (WHO), is a lack of growth in body length compared to age (BL/A) or height compared to age (BH/A) with a limit of <-2 SD. Based on data on nutritional status evaluation in Indonesia in 2015, the incident of stunting among children under two in South Kalimantan was 30.9% and at Hulu Sungai Utara district was 39.4%. Based on data from Hulu Sungai Utara District Health Office in 2017, the highest stunting area was the working area of Sungai Malang Integrated Health Service with 46.6%, which mad e it classified as a public health problem since the percentage was ≥20%. The purpose of this study was to determine factors related to stunting. **Methods:** This study used a case control research design. The subjects were mothers who had children under two, consisting of 34 cases and 34 controls. Sampling was performed with simple random sampling. The data obtained were analyzed by chi-square test. **Results:** There was relationship between family income and incidence of stunting (p = 0.028, OR = 3.429) as well as between mother's job and incidence of stunting (p = 0.015, OR = 0.261). Meanwhile, the mother's education level and maternal age were not related to the incidence of stunting. **Conclusions:** Family's income and mother's job could be considered as factors related to stunting.

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Vitamin D Deficiency among Pregnant Women in Rural Bangladesh

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Keywords: Vitamin D deficiency · Vitamin D status · Pregnant women · Bangladesh

Background/Aims: Insufficient vitamin D status has been associated with adverse pregnancy outcomes; thus, it has been recognized as a public health concern. There have been no published data on vitamin D status in Bangladeshi pregnant women. The objective of this study was to determine the prevalence and risk factors of vitamin D deficiency among pregnant women in rural Bangladesh. **Methods:** A cross-sectional study was conducted with 522 pregnant women, with a gestational age of <20 weeks. Socio-demographic, pregnancy, and health related information were collected. Serum vitamin D concentration was measured. Logistic regression analysis was carried out to determine the association of socio-demographic and pregnancy-related factors with vitamin D deficiency. **Results:** Overall, 8.5% of the subjects had vitamin D deficiency (serum vitamin D level <25 nmol/L), 56.3% had vitamin D insufficiency (serum vitamin D level between 25–50 nmol/L), and the rest of them (35.2%) had adequate vitamin D status (serum vitamin D level more than 50 nmol/L). Serum vitamin D levels in pregnant women were significantly associated with their age (r = 0.261; p = 0.0001), parity (r = 0.296; p = 0.0001), and gestational age (r = 0.101; p = 0.022). Pregnant women with higher parity and higher gestational age were significantly less likely to have vitamin D insufficiency or deficiency. **Conclusions:** This study revealed a high prevalence of vitamin D inadequacy among rural Bangladeshi pregnant women. Vitamin D status was found to be independently associated with parity and gestational age. Further research to identify various lifestyle factors, including exposure to sunlight, is needed to develop appropriate intervention program for preventing vitamin D deficiency in this population.

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Complementary Feeding Self-Efficacy: A Concept Analysis

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Keywords: Complementary feeding self-efficacy · Feeding practice · Maternal self efficacy · Children

Background/Aims: Complementary feeding is a crucial aspect for children's health and growth. Several children receive nutritionally adequate and safe complementary foods that meet the criteria of dietary diversity and appropriate feeding frequency. Applied to nutrition, self-efficacy may predict which dietary behavior that people feel they were able to change, how much effort they would have to spend while trying to adopt the new behavior, and how long they would persist when facing obstacles. This paper attempted to recognize the attributes of complementary feeding self-efficacy. **Methods:** A research was conducted on scientific articles available on the databases EBSCO and Proquest by using these search terms: "feeding practices", "maternal self- efficacy", "mother's self-efficacy" , and "maternal self-confident". A manual search

was also performed, which included checking textbooks on complementary feeding and self efficacy. Concept analysis was performed following the method by Walker and Avant. Inclusion criteria were defined and a database was created with the articles included. **Results:** The information collected was incorporated, responding to the eight steps proposed in the method. The concept of complementary feeding self-efficacy is defined as mother's beliefs in her ability to give adequate complementary food in terms of time, portion, frequency and variety; to give safe and hygienic food; to create comfort and warm environment while the child was eating, and to give appropriate response towards any cues given by the child while eating including signs for hunger and satiety. **Conclusions:** The attributes identified in this study could contribute to improved understanding of complementary feeding self-efficacy concept, which will eventually be useful to design intervention program.

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Primary Care Perspective on Prevention of Nutrition Problems among Children during First Thousand Days of Life in Manado

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Keywords: First 1000 days of life · Nutrition · Prevention
Background/Aims: In dealing with demographic conditions in the second and third decades of this millennium, Indonesia should intensively prepare its next generation. Prevention and management of malnutrition can be performed through empowerment of primary care doctors to recognize and handle malnutrition quickly and accurately to reduce the risk or long-term complications. **Methods:** This study used a qualitative descriptive research method. Assessment through interviews was carried out in community health centers (*Posyandu*) in Manado. **Results:** Community approach needs to be applied by doctors who work in primary health services (*Puskesmas*) by applying one of the concepts of family doctors as community leaders. Thus, access to quality health services can be improved through improving the performance of Community Health Center by involving primary care doctors in overcoming nutritional problems in the first thousand days of children's life in Manado. **Conclusions:** Appropriate knowledge at every stage of a child's development is needed to prevent nutritional problems. The government policy is sufficient to prevent nutritional problems in the early stages. The roles of *Posyandu* and the care of parents could contribute to prevent nutritional problems. The facilities and infrastructure at *Puskesmas* should be adequate and the doctors working there should be prepared to prevent nutritional problems in the early stages of infant development.

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Association between Probiotics, Antibiotics and Feeding Practice with Extrauterine Growth Restriction

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Keywords: Very low birth weight infants · Extrauterine growth restriction · Risk factors
Background/Aims: Extra uterine growth restriction (EUGR) occurs frequently in infants with very low birth weight (VLBW), whose influencing factors are still inconclusive. This study aimed to investigate the incidence of EUGR and related factors in infants with VLBW i.e. the use of probiotics and antibiotics as well as feeding practices. **Methods:** A retrospective cohort study was performed in six NICUs in Guangdong, China. Infants were divided into two groups (EUGR and non-EUGR at discharge or corrected 37 GA) to compare the general characteristics, postnatal growth, feeding practices, and use of probiotics and antibiotics between groups. Multivariate logistic regression analysis was used to find out the independent influencing factors of EUGR. **Results:** A total of 961 VLBW infants were included in the study with 72.9% of them developed EUGR. Compared with the non-EUGR group, the EUGR group had lower weight growth velocity, longer time to regained birth weight, longer duration of using amino acids, later start of parenteral and enteral feeding and they reached full enteral feeding (p < 0.05). Analysis with logistic regression model showed that GA (OR = 4.816), singleton (OR = 0.518), birth weight (OR = 0.989), time to regain birth weight (OR = 1.152), daily weight gain velocity remained (OR = 0.947), time to start amino acids (OR = 1.612), duration of use of amino acids (OR = 1.055), and time to reach full enteral feeding (OR = 1.037) (all p < 0.05) had relationship with EUGR. **Conclusions:** Reduction of time to start amino acids , duration of use of amino acids, and time to reach full enteral feeding might decrease the incidence of EUGR for the VLBW infants. However, the use of probiotics and antibiotics had no effect on EUGR.

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Complementary Feeding Practices and Nutritional Status of Children 6–23 Months in Camarines Norte, the Philippines

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Keywords: Complementary feeding · Infant and young child feeding · Minimum acceptable diet · Minimum dietary diversity · Minimum meal frequency

Background/Aims: Inappropriate feeding practices among children aged 6–23 months are a major cause of under nutrition. Thus, this study aimed to observe complementary feeding practices and nutritional status of children aged 6–23 months. **Methods:** A cross-sectional survey design was employed to collect data from Filipino mother-and-child pairs, selected by simple random sampling among 110 infants aged 6–11 months and 127 children aged 12–23 months in Mercedes, Camarines Norte. Feeding practices and anthropometry data were assessed by interviewing the caregiver using questionnaire and 24-h recall, following the ProPAN methodology. **Results:** Prevalence of stunting, wasting, and underweight among the infants were 22.0%, 9.3%, and 15.5%, respectively. Meanwhile, higher rates were found among 12–23 months old children with 31.5%, 15.6%, and 28.3%, respectively. Based on WHO infant and young child feeding (IYCF) indicators, it was observed that inadequate dietary practices by the mothers reflected on infants aged 6–11 months. Only a small proportion of infants 6–11 months were meeting the minimum dietary diversity (MDD) and minimum acceptable diet (MAD) at 28.2% and 15.5%, while children aged 12–23 months were enjoying the MDD and MAD at 66.9% and 33.9%, respectively. Good frequency and timing of feeding were also poorly practiced, while bottle feeding was still prevalent. **Conclusions:** To address the World Health Organization (WHO) guiding principles for infant and child feeding and combating micronutrient deficiency, there is a need to focus on food-based strategies to optimize diets during complementary feeding period using locally available foods in the Philippines.

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Maternal Characteristics and Seafood Consumption of Selected Filipino Urban Pregnant Women

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Keywords: Seafood · Maternal nutrition · Maternal characteristics · Fish

Background/Aims: Maternal characteristics and good maternal nutrition before, during, and after conception directly impact survival, health, and development of newborns and children. Results of the 8th National Nutrition Survey revealed that nutritional status of pregnant Filipino women was far from optimal as 24.8% of them were considered nutritionally at risk. One of the most important nutrients that should be supplied by the mother's diet to the fetus is Docosahexaenoic acid (DHA) since it is needed in development of the child's cognitive function. Fatty acid analysis of different food items revealed that seafood were the best sources of omega- 3 fatty acid, particularly docosahexaenoic acid. However, a dietary assessment conducted among Filipino pregnant and lactating mothers showed that intake of fish decreased from 2003 and 2008.This finding highlighted the importance of conducting an assessment of seafood consumption of pregnant Filipino mothers. Thus, the objective of this study was to describe the maternal characteristics and determine the commonly consumed seafood among urban Filipino pregnant mothers. **Methods:** A total of 132 Filipino pregnant women on their third trimester were interviewed on maternal characteristics, 24-h dietary intake, and commonly consumed seafood. **Results:** The three most commonly consumed types of seafood were tilapia, scad, and milkfish. Different cooking methods applied on the commonly consumed seafood items were also obtained. **Conclusions:** Findings of this research may be used as basis of studies involving measurement of maternal seafood and DHA consumption.

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Knowledge and Hydration Status Among Adolescent in Surabaya

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Keywords: Dehydration · Knowledge · Physical activity level · Adolescent

Background/Aims: Dehydration is a condition where there is a lack of fluid in the body that can impact body endurance. This research aimed to describe the prevalence of dehydration among adolescents and factors related to it. **Methods:** A total of 66 students aged 12–15 years old from Grade 7 and Grade 8 of Junior High School Muhammadiyah 4 Gadung Surabaya were recruited. Subjects were interviewed to assess their knowledge level, physical activity level (PAL), and water intake. Dehydration status was measured using a self assessment method called *Periksa Urin Sendiri (PURI)*, by comparing their urine color to a chart developed by Armstrong. An independent t-test was performed to see the difference in mean water intake between subjects according to their knowledge level. **Results:** It was found that 79% of the subjects had low knowledge regarding required water intake, 97% subjects were physically inactive, 67% consumed water less than the guideline, and 67% of them were dehydrated. There was no significant difference in terms of water intake between both groups, although subjects with higher knowledge used to drink more water than those with lower knowledge. **Conclusions:** It is necessary to educate adolescents at school to improve their knowledge and water intake.

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Correlation between Mother's Behavior with the First 1000 Days of Life with Nutritional Status of Children Under Two Years in Rural Area

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Keywords: First thousand days of life · Mother's behavior · Nutritional status of children under two years

Background/Aims: The aim of this study was to review mother's behavior on the first thousand days of life and its correlation with nutritional status of children under two. **Methods:** This study was designed as a cross-sectional study. The subjects were selected purposively; with total subjects of 53 mothers from Gunung Geulis village, Sukaraja sub-district, Bogor who had children aged 0–23 months. Data were collected by interview and direct measurement. **Results:** Pearson correlation test showed that there was a significant correlation between mother's attitude and practice of subjects in the 0–6 month period with nutritional status WHZ ($p < 0.05$). Furthermore, there was a tendency of correlation between mother's knowledge about pregnancy and nutritional status WHZ ($p = 0.075$; $r = -0.247$). Moreover, there was a significant correlation between mother's knowledge and attitude about nutrition and the first thousand days of life ($p = 0.043$; $r = 0.279$), but there was no correlation between mother's knowledge with practice of nutrition and the first thousand days of life ($p = 0.758$; $r = 0.043$) as well as between mother's attitude with practice about nutrition and the first thousand days of life ($p = 0.364$; $r = 0.127$). **Conclusions:** Mother's knowledge regarding the first 1000 days of life was correlated with their attitude on nutrition; thus, improving nutritional knowledge of mothers would be highly beneficial.

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Hemoglobin Level Is Associated with Chronic Energy Deficiency and Gestational Age among Pregnant Women

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Keywords: Hemoglobin level · Gestational age

Background/Aims: Mothers' nutritional status can affect birth weight of the babies. The prevalence of anemia and chronic energy deficiency (CED) among pregnant women are still high in Indonesia. Moreover, gestational age and chronic energy deficiency (CED) are related to hemoglobin levels during pregnancy. The aim of this study was to analyze correlation between hemoglobin levels and gestational age as well as CED in pregnant women. **Methods:** This cross-sectional study was conducted in Madua, East Java, Indonesia and it included 247 pregnant women. Hemoglobin level was measured by cyanmethemoglobin, while chronic energy defi-

ciency (CED) was determined by measuring the Upper Arm Circumference (MUAC). Pearson correlation was used to analyze correlation between variables. **Results:** This study found prevalence of anemia was 52.2% and CED was 17.8%. The average hemoglobin level for pregnant women was 10.8 g/dl and MUAC was only for 26.2 cm. The average gestational age among the subjects was 22.8 months. Haemoglobin level during pregnancy was positively correlated with gestational age ($p < 0.01$) and chronic energy deficiency (CED) ($p < 0.01$). High prevalence of anemia was found in this study. Pregnant women who had macro energy deficiency were prone of micronutrient deficiencies. **Conclusions:** Improvement and prevention of macronutrient deficiencies were needed to decrease the prevalence of micronutrient deficiencies.

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Maternal Efforts to Optimize the First 1000 Days of Life: Can It Reduce Stunting Successfully in Indonesia?

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Keywords: Stunting · Children · Health behaviour

Background/Aims: Results of a recent national health survey show that about one-third of children under five years old in Indonesia suffer from stunting. It is one of the biggest concerns of the government due to intergenerational adverse health effect of stunting. A community–based health and nutrition approach that is started in early life might be one of the ways to address this challenge and break the cycle of stunting. **Methods:** A cohort retrospective study using Sentinel 2017 data was conducted to investigate effectiveness of maternal health behavior efforts within the first 1000 days of life related to stunting prevalence as observed from the community–based approach. Data were examined using logistic regression. **Results:** The incidence of stunting among children aged 12 months or less were almost 3 times of the incidence of wasting and almost double of the number of underweight cases. Knowledge on exclusive breastfeeding and attendance in postnatal care of mother and children were significantly associated with stunting. In addition, children from households with open defecation practice were also at increased risk of stunting. Risk of stunting was also significantly affected by the mother's place of resident. **Conclusions:** The equity and equality of maternal knowledge on health and improvement of health behavior in the family as well as community were strongly advisable to decrease stunting prevalence in Indonesia.

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Effect of Fatty Acid Composition of Breast Milk on Levels of Docosahexanoic Acids – Red Blood Cell (DHA-RBC) and Cognitive Development of 4-Month-Old Infants

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Keywords: Breast milk · DHA · Red blood cells · Infant cognitive development

Background/Aims: Breast milk contains various kinds of fatty acids, which play a role in growth and development of an infant. Among the fatty acids, DHA plays an important role in brain development. Level of DHA in the brain is associated with level DHA-RBC. It has been shown that there is a relationship between the level of DHA-RBC with cognitive development of infants who are given exclusive breast feeding. The status of fatty acids in infants is an illustration of the fatty acids content of the mother's breast milk. This study aimed to determine effect of fatty-acid composition in breast milk on infants' DHA-RBC and their cognitive development. **Methods:** The study was conducted on infants who were given exclusive breastfeeding. As many as 47 pregnant women who were in their third trimester were selected as respondents. Their food intake was recorded until delivery and the baby was 4 months old. Composition of fatty acids in breast milk, red blood cell, and cognitive development were measured when the infants were four months old. **Results:** Cognitive development of infants could be attributed to consumption of ALA contained in breast milk (OR = 1.458; 95% CI = 0.975–2.179) and infant's DHA-RBC adequacy index (OR = 2.513; 95% CI = 0.893–7.076). The consumption of DHA from breast milk could increase infant's DHA-RBC level by 0.349. Infant's cognitive development was not only influenced by the level of DHA-RBC, but also by ARA. **Conclusions:** When there is adequate level of DHA in red blood cell, supplementation of DHA from food would have less effect on changes in infant's DHA-RBC concentration.

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Metabolic Syndrome in Overnutrition Adolescents in Makassar

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Keywords: Metabolic syndrome · Adolescent · Obesity · Overweight

Background/Aims: Increased incidence of obesity triggers the incidence of metabolic syndrome (MS) in adolescents. This study aimed to see an overview of the incidence of MS in overnutrition adolescents in Makassar. **Methods:** This study was conducted with a cross-sectional design involving 53 overnutrition adolescents as subjects. The sample was obtained by sketching 157 students. Nutritional status was determined based on anthropometry measurement. Measurement of blood pressure, fasting blood glucose level, blood triglyceride level, and blood HDL cholesterol were carried out to determine the number of MS risk factors the subjects had. **Results:** In general, the prevalence of MS found in the subjects was 7.5%. In overweight subjects, MS was not found, but in obese subjects, the prevalence of MS was 14.8%. **Conclusions:** The prevalence of metabolic syndrome in obese adolescents was higher than overweight adolescents.

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Breakfast Pattern of Indonesian Adolescents from Low-Mid Socioeconomic Background

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Keywords: Adolescents · Breakfast · Socioeconomic

Background/Aims: Breakfast is an important meal to support good nutrition and health, however, irregular breakfast is commonly practiced by adolescents. Understanding breakfast habit is critical to formulate intervention in adolescents. This study aimed to describe adolescents' breakfast pattern and to determine its relationship to breakfast context. **Methods:** A cross-sectional study was conducted among 905 high school students of first grad from four non-high-ranks public schools in Makassar. Survey questionnaire was distributed to collect information on breakfast frequency, breakfast content, and breakfast context, as well as amount of pocket money received. Chi-squared test was performed to analyze association between variables. **Results:** Only 56% of the respondents had breakfast everyday, 38% had breakfast five days per week or less, and 6% reported that they never had breakfast at all. Rice with egg, bread, and milk were the three most common items con-

sumed during breakfast. Breakfast was frequently consumed at home or school, either with family members, with school friends, or alone. Not feeling hungry was a significant reason for infrequent breakfast (p < 0.05). Having a companion during breakfast was inversely related to frequency of breakfast (p < 0.05). Location where breakfast was taken was significantly associated with breakfast frequency (p < 0.05). Pocket money was found not to be associated with breakfast frequency (p < 0.05). **Conclusions:** Adolescents from low- to mid-socioeconomic part of the population could face problem of irregular breakfast and less healthy type of breakfast consumed. Breakfast context is necessary to consider in designing intervention to improve breakfast habit.

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Knowledge, Attitude, and Practice towards Anemia and Their Associations with Prevalence of Anemia and Height-For-Age Z-Score among Indonesian Adolescent Girls

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Keywords: Adolescent girls · Anemia · Linear growth · Knowledge-attitude-practice

Background/Aims: Information on roles of knowledge, attitude, and practices (KAP) towards anemia among adolescent girls' nutritional status are still rare. This study investigated KAPs to understand risk factors of anemia and linear growth failure in adolescent girls. **Methods:** A cross-sectional study was undertaken, recruiting 335 adolescent girls by cluster random sampling. The KAP questionnaire for anemia was adapted from FAO's 2014 nutrition-related KAP guidelines. Dietary practices information was obtained from 2-days 24-hour recalls and semi-quantitative food frequency questionnaire. Nine questions on knowledge, three on attitudes, and six on practices were scored to yield overall KAP score. Capillary blood samples were measured for hemoglobin (Hb) concentration using the instrument HemoCue 201. Anthropometric measurements were used to obtain height-for-age z-score (HAZ). Associations between KAP, anemia, and HAZ were analyzed using multivariate-logistic regression. **Results:** Mean Hb was 119.7 g/L with 45% of the adolescent girls being anemic (Hb<120 g/L) and 25% being stunted (HAZ<-2 SD). The median KAP score was 7 out of 18. Individual KAP variable and overall score towards anemia were not associated with the condition of being anemic. KAP score was associated with HAZ and 1 point KAP score increment was associated with a significant increase of 0.037 HAZ (adjusted B = 0.037, 95% CI = 0.008–0.066, p = 0.012). KAP towards anemia was significantly associated with HAZ incre-

ment in adolescent girls after adjusting for age and maternal education. **Conclusions:** Policy development should integrate health promotion strategies to improve adolescents' understanding about anemia and to improve their linear growth performance. Further study is needed to confirm the causality between KAP toward anemia and linear growth failure.

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Zinc Status and Cognitive Development of Children: A Cross Sectional Study in Laguna, Philippines

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Keywords: Zinc · Cognition · Language · Attention · Memory

Background/Aims: The study aimed to determine zinc status and its relationship to cognitive development of 2–3 year olds children in Laguna, the Philippines. A multi-stage stratified random sampling was used in a cross-sectional study of 149 children with no present illnesses and with approved oral and written consent from parents. Plasma/serum zinc was analyzed using flame atomic absorption spectrometry. Zinc deficiency prevalence was evaluated using the suggested IZiNCG lower cut-off points and guidelines for public health concern. The Early Childhood Care and Development program checklist, Metro Manila Developmental Screening Test and Child Development Index were adapted to determine level of cognitive development of children. All statistical analyses were assessed using SPSS version 19 with p < 0.05 deemed as statistically significant. The study was reviewed and approved by the University of the Philippines Manila Research Ethics Board. **Results:** Overall, zinc deficiency prevalence among the children was 2%, which was considered as low public health significance. Zinc deficiency was about 1% of children with delayed cognitive development while 1.3% of them had average cognitive development. No children with advanced development were zinc deficient. Correlation analysis revealed that zinc status was significantly associated with cognitive development (r=.075, p = 0.000). **Conclusions:** Zinc deficiency in early childhood influences cognitive development. Poor growth and development due to zinc deficiency may have been attributed to depression on poor appetite. Zinc status is associated with development of attention, memory, and language skill of children, which can be attributed to its structure and function in the brain.

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Risk Factors of Low Birth Weight in the Working Area of Oesapa Public Health Centre, Kupang, East Nusa Tenggara

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Keywords: Low birth weight · Risk factors · Nutrition · Pregnancy

Background/Aims: Low Birth Weight (LBW) is a term to describe babies born weighing less than 2500 grams (5 pounds, 8 ounces). LBW is associated with higher risks of mortality, morbidity, and disability in neonates, babies, and children. It creates negative impact in the long term such as disorder in physical growth and psychological and cognitive development of children. Based on data from the Central Statistics Bureau of East Nusa Tenggara, Kupang ranked 5th from 22 regencies, with 337 LBW cases. This study aimed to determine risk factors of LBW in the working area of Oesapa Public Health Center, Kupang. **Methods:** This was an analytical survey with case-control study. The sample of this study consisted of 78 mothers (1:1, matched by maternal age). Data were analyzed using Chi-squared test and logistic regression analysis. **Results:** Food expenditure, eating habit, pre-pregnancy nutritional status, weight gain during pregnancy, and antenatal care frequency were found not to be the risk factors of LBW. On the other hand, parity (2.538), range of pregnancy (2.810), and nutritional status during pregnancy (5.000) were shown as the risk factors of LBW. **Conclusions:** Oesapa Public Health Center needs to improve mothers' knowledge on healthy lifestyle before pregnancy, especially related to recommended exercises and nutritious food intake.

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Strategy for Successful Exclusive Breastfeeding among Female Police Officer in East Nusa Tenggara

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Keywords: Strategy · Exclusive breastfeeding · Policewoman

Background/Aims: Exclusive breastfeeding is an effort to obtain optimal growth, as breast milk contains essential nutrients required for the growth and development of infants as well as antibodies for the immune system. This study aimed to explore strategies of successful exclusive breastfeeding among female police officers in East Nusa Tenggara. **Methods:** This study was a qualitative study with explorative design consisting of 10 female police as respondents. **Results:** The study found that: (1) the respondents were aware of the importance of exclusive breastfeeding for the growth of their children; (2) the respondents perceived occupation not as a barrier to provide exclusive breastfeeding; (3) the respon-

dents were adequately exposed to information in mass media related to exclusive breastfeeding; (4) breastfeeding room was not available at the office resulting in their decision to breastfeed at home; (5) husbands' role was important to provide support by preventing their wives from giving formula before the babies were 6 months old; (6) the respondents' families provided support for exclusive breastfeeding by taking care of the babies during work time; (7) superiors at work also gave support for the respondents in terms of exclusive breastfeeding; and (8) the success of exclusive breastfeeding was strongly driven by willingness and acceptance of it as a natural thing. **Conclusions:** The respondents recruited in this study had good knowledge, attitudes, and information exposure on the importance of exclusive breastfeeding. Furthermore, they received adequate support from their husbands, families, and superiors. However, breastfeeding room should be available in the office to promote and support exclusive breastfeeding among female police officers.

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Use of Supplement and Complementary Medicine in Chinese Preschool Children with Autism Spectrum Disorders in Hong Kong: Preliminary Findings

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Keywords: Nutrition supplement · Complementary medicine · Autism spectrum disorders · Chinese

Background/Aims: Data on the use of supplement and complementary medicine among children with autism spectrum disorders (ASD) are still limited in Hong Kong. This abstract presents preliminary findings from an ongoing case-control study comparing eating behaviors, diet quality, and gastrointestinal symptoms in children with ASD and typically developing (TD) children (ClinicalTrials.gov Identifier: NCT03270306). The study was funded by the Health and Medical Research Fund, Food and Health Bureau, HK SAR (HMRF#14152251). **Methods:** Data on use of supplements and complementary medicine among a convenience sample of 56 families with ASD children and 27 families with TD children aged 3–6 years were compared. Parents were asked to complete a questionnaire covering demographic information and child's usage of supplement and complementary medicine. Comparative analyses were performed. **Results:** Children's mean age was 4.8 years and 68 (81.9%) of them were boys. Use of supplement did not differ significantly between ASD group (n = 22; 39.3%) and TD group (n = 13; 48.1%) (p = 0.444). Among supplement users in both groups, the three most commonly used supplements were fish oil/flaxseed oil (ASD vs. TD: 35.5% vs. 33.3%), calcium supplement (ASD vs. TD: 25.8% vs. 22.2%), and vitamin C supplement (ASD vs. TD: 12.9% vs. 11.1%). ASD group (n = 16; 28.6%) tended to show higher usage of complementary medicine than TD group (n = 3; 11.1%) (p = 0.076) in terms of traditional Chinese medicine, acupuncture, and massage. **Conclusions:** Our

preliminary findings suggested that supplement use was common in both ASD and TD children in Hong Kong and ASD children tended to show a higher usage of complementary medicine than TD children.

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Validity of a Short Diet Questionnaire on Assessing Diet Quality and Habits of Hong Kong Children Aged 3–6 Years

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Keywords: Dietary assessment · Children · Chinese
Background/Aims: Simple questionnaires assessing children's diet quality and diet habits are still lacking. This study evaluated validity of a short diet questionnaire (SDQ) against 7-day diet record (DR) in assessing children's diet quality and diet habits. **Methods:** A convenience sample of 58 mothers completed SDQ and DR for their children. SDQ items covered various daily and weekly dietary behaviors with item score ranged from 1 to 4. Subscale diet quality (DQ) score, diet habits (DH) score, and total diet index (TDI) score were derived. Higher scores indicated better diet quality and habits. Test-retest reliability of SDQ was assessed with mothers completing SDQ twice with at least 7 days apart. Pearson's correlation test was used to examine correlations between DQ, DH, TDI, and daily nutrient intakes estimated from DR as well as test-retest reliability of SDQ. **Results:** Of 58 children examined, 31 of them were girls. Children's mean age was 4.6 years. Significant correlation (p < 0.05) was observed between DQ score and energy percentage from total fat (r = –0.345), fiber intake (r = 0.335), and intakes of selected minerals including calcium, iron, magnesium, phosphorus, potassium, and zinc (r from 0.229 to 0.392). There was significant correlation (p < 0.05) between DH score and fiber intake (r = 0.270), and percentage energy from total fat (r = –0.262). Higher TDI score was associated with higher intake of fiber, magnesium, phosphorus, zinc (r from 0.276–0.368, p < 0.05), while lower energy percentage from total fat (r = –0.372, p = 0.004) and saturated fat (r = –0.277, p = 0.035). Results of test-retest reliability ranged from moderate to excellent for DQ (r = 0.745), DH (r = 0.534), and TDI (r = 0.795) (all p < 0.001). SDQ showed moderate validity with respect to key nutrient intakes. **Conclusions:** Questionnaire developed in this study had relatively good validity to be used to assess children's dietary behavior.

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Effect of Class on Dietary Intake Balance in Junior High School Students

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Keywords: Adolescents · Dietary intake balance · Dietary education
Background/Aims: In terms of dietary intake of adolescents, numerous studies have pointed out inappropriate eating habits. Dietary education has been shown to result in an increase in vegetables and fruit intake as well as breakfast intake among children. Therefore, there is a need to enrich dietary education in order to improve the currently inappropriate eating habits of adolescents. This study aimed to examine effects of education on dietary intake balance among junior high school students. **Methods:** A total of three self-checks of dietary intake were carried out from July 2017 to January 2018 for 1st to 3rd grade students in a junior high school. In addition, education on dietary intake balance was held in July (for the 1st grade) and October (for the 3rd grade). For the 1st grade students who took the class after the first self-check, the increase of the total score was the largest compared to other grades. In terms of fruit intake, improvement was seen in each session. However, the third grade students who took the lesson after the second self-check did not see decrease from the 2nd session to the 3rd session. **Conclusions:** Implementation of education on dietary intake balance might contribute to acquisition of desirable eating habits in junior high school students.

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Correlation of Macronutrient Consumption, History of Infection, and Low Birth Weight with Nutritional Status of Children Under Five in Oepoi Public Health Center, Kupang

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Keywords: Consumption level · Energy · Protein · Infectious diseases · LBW · Nutritional status
Background/Aims: Stunting reflects failure to thrive in children under five due to chronic malnutrition, especially in the first 1,000 days of life. The prevalence of stunting in East Nusa Tenggara and in Kupang were high, according to WHO. This study aimed to analyze correlation between consumption level of macronutrients, history of infectious diseases, and Low Birth Weight (LBW) with nutritional status of children under five. **Methods:** The study was conducted in the working area Oepoi PHC from January to October 2018. The population was all mothers (1,333 people) attending the PHC who had children aged 12–59 months old. The sample size was 93 mothers selected by simple random

sampling. Statistical analysis was performed by Chi-squared test with α = 0.05. **Results:** Levels of energy and protein consumption were low (59.13% and 54.83%). Moreover, the children had more history of infectious diseases (61.29%) and only few of them had a history of LBW (10.75%). The percentage of stunted children was 55.91%. Statistical analysis showed that level of energy and protein consumption and history of infectious diseases were related to nutritional status of children under five (p = 0.000), while the history of LBW was not related to nutritional status (p = 0.783). **Conclusions:** Provision of adequate nutrients for children, including amount, type, and frequency of meals, as well as their need for personal and environmental hygiene, needs to be considered by the family to improve nutritional status of the children.

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Association of Dietary Intake and Physical Activity with Post-Partum Weight Gain among Urban Pregnant Women in Petaling, Selangor

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Keywords: Gestational weight gain · Dietary intake · Physical activity

Background/Aims: Gestational weight gain (GWG) is one of the determinants in health and nutrition status of mothers and their offspring. In recent years, there has been an increasing rate of obesity in general, including among pregnant women. One of the factors affecting pregnancy outcome is the amount of weight gain during pregnancy. Inadequate and excessive gestational weight gain during pregnancy is associated with adverse outcomes for both, mother and child. Thus, the present study aimed to assess association between gestational weight gain and pregnancy outcomes among urban pregnant women. **Methods:** A cross-sectional study was conducted through questionnaire on socio-demographic profile, anthropometric measurement, food frequency questionnaire (FFQ), and pregnancy physical activity questionnaire (PPAQ). Subjects were comprised of 209 live born and singleton pregnancy women from the healthcare clinic centers in Petaling district. Data obtained were analyzed using Pearson's correlation test and Nutritionist Pro software. **Results:** There was significant association between dietary intake and physical activity with gestational weight gain. **Conclusions:** Excessive and inadequate gestational weight gain was higher among urban pregnant women most probably due to sedentary and unhealthy lifestyle.

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The Association Between Maternal Folate Intake During Pregnancy and The Birth Weight Z Score: A Cross-Sectional Study in Northwest China

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Keywords: Folic acid supplements – Dietary folate – Total folate – Pregnancy – Birth weight Z score

Background/Aims: Except for neural tube defects, the effects of maternal folate intake during pregnancy on other birth outcomes are not generally recognized. This study aimed to investigate the associations of maternal folate (dietary folate, supplemental folic acid and total folate) intake with the birth weight Z score. **Methods:** We used data from a cross-sectional study in Shaanxi Province of Northwest China. A total of 7307 women who were within 12 months (median 3; 10th-90th percentile 0–7) after delivery were included. Two-level models were adopted to examine the associations of folate intake with birth weight Z score, controlling for a minimum set of confounders that were identified in a directed acyclic graph. **Results:** When controlling for selected confounders, dietary folate intake throughout pregnancy was positively associated with the birth weight Z score (per one-unit increase in the log-transformed value: b coefficient 0.058; 95% CI 0.007, 0.108). For every 10-day increase in the duration of folic acid supplementation during the first trimester, the birth weight Z score increased by 0.008 (95% CI 0.001, 0.014). There was no association between folic acid supplementation during the second or third trimester and the birth weight Z score (P > 0.05). A higher total folate intake during pregnancy was associated with a higher birth weight Z score (per one-unit increase in the log-transformed value: b coefficient 0.104; 95% CI 0.053, 0.156). **Conclusion:** Our study suggested that maternal folate intake during pregnancy was positively associated with the birth weight Z score.

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A Survey on Nutrition Literacy Related to Salt among Primary Pupils and, Parents in Fengtai District of Beijing

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Keywords: Pupils · Parents · Salt · Nutritional literacy

Background/Aims: The study aimed to understand the salt-related nutrition literacy of pupils and their parents, and to provide scientific basis for salt reduction intervention. **Methods:** We applied questionnaire survey to collect salt-related knowledge, attitude and behavior among 3–5 grade pupils and their parents from 6 primary schools in Fengtai District of Beijing. **Results:** A total of 1160 students and 1079 parents were surveyed. The awareness rate

of salt and health related knowledge was 27.5% among students and 54.6% among parents. The awareness rate of parents was higher than that of students (P < 0.05). The average awareness rate of high salt condiment among students was 28.8%, and that of parents was 52.2%, there was a significant difference between parents and students (P < 0.05). The average awareness rate of high salt snacks among students was 33.3%, higher than that of parents (24.8%), the difference was statistically significant. The awareness rate of nutrition label among students (86.8%) was lower than that of parents (88.5%). The utilization rate of nutrition label among students (39.1%) was higher than that of parents (21.2%)(P < 0.05). 62.8% of the students'taste was most affected by their parents. The proportion of parents planning light diet was 88.4%, and that of students planning light diet was 66.4%(P < 0.05). **Conclusion:** The awareness rate of salt-related knowledge among pupils and parents was low, but the willingness to light diet was strong. Students'nutritional knowledge was more efficient in transforming into behavior than parents.Nutrition education should be strengthened.

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Nutrition Education on Discouraging Sugar Intake Led to Improve The Moderation Factor of Nutrition Quotient in Pre-School Children

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Keywords: Nutrition education · Nutrition quotient · Dietary guidelines · Pre-school children

Background/Aims: Child food habit has affected the health as well as food habit of one's whole life. To develop the good food habit, public health intervention has predominantly focused on nutrition education and guidelines for discouraging intake of sweets for pre-school children. **Methods:** The effectiveness of nutrition education was measured with validated assessment tool, nutrition quotient in pre-school children. Pre-school children's nutrition quotient, the practice of the dietary guidelines of pre-school children were measured in educated(N = 47) and non-educated group(N = 49) after 11 weeks of nutrition education on discouraging sugar intake. Nutrition quotient for Korean preschoolers(NQ-P) was administered to evaluate nutrition adequacy and dietary quality. The 14 items of the NQ-P checklist questionnaire were performed by parents. Statistical analysis was performed using SAS 9.4. **Results:** The NQ-P score were not significantly in both groups after 11 weeks of nutrition education on discouraging sugar intake. Factor scores of balance and environment were not significantly different in both groups. Factor score of moderation was significantly lowered in education group(P < 0.05). Score of practice of the dietary guidelines in pre- school children were not significantly different in both groups. NQ-P score were significantly correlated with the score practice of the dietary guidelines for pre-school children (r = 0.202, p < 0.05). **Conclusion:** Nutrition education on discouraging sugar intake led to improve moderation factor in pre-school children although nutrition education was not effective to change total nutrition quotient, the practice of the dietary guidelines in pre-school children

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Effect of Oral Nutritional Supplementation on Growth in Children with Malnutrition: A Systematic Review and Meta-Analysis

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Keywords: Oral nutritional supplements, Malnutrition, Children, Growth

Background/Aims: Oral nutritional supplements (ONS) are used to improve the quantity and the quality of nutritional intake in children at risk of malnutrition. **Methods:** We conducted a systematic review to examine the effects of ONS on growth among children aged 1–13 years with mild to severe malnutrition. Electronic databases were searched for relevant randomized, controlled trials (RCTs). A meta-analysis was conducted on changes in weight and height. **Results:** Ten RCTs were included, representing 2006 children (6.34±1.44 years old, 55% boys), most of whom had mild to moderate malnutrition. The intervention durations ranged from 8 days to 2 years with 6 RCTs reported results on 30–90 days, 3 of which compared ONS plus dietary counseling (DC) with DC alone. Meta-analysis of these 3 RCTs showed that children who received ONS for 30 days plus DC had significantly greater improvements in weight (0.209 kg, 95% CI [0.142, 0.277], P < 0.001), weight-for-age percentile (WAP; 2.577 [1.640, 3.513], P < 0.001), and weight-for-age z-score (WAZ; 0.131 [0.08, 0.182], P < 0.001). Children continued to gain significantly greater weight, WAP, and WAZ at 60 and 90 days. Significantly greater gains in height-for-age percentile and height-for-age z-score were observed at 60 days (2.413 [1.369, 3.456], P < 0.001) and 90 days (0.082 [0.006, 0.158], P = 0.035), respectively. Sensitivity analysis including the RCTs that compared with usual diet or a control supplement did not change the results. Compared to DC alone, ONS given in addition to DC are more effective in improving growth in weight and height in children who are either malnourished or at risk of malnutrition.

Track 3: Holistic Nutrition Well-Being

Oral Presentation

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Socio-Economic Status and Body Fat Percentage among Women in Rural Area

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Keywords: Body percentage · Socio-economic status

Background/Aims: Obesity is related to some of leading causes of death. Higher body fat percentage increase some health risks, particulalrly in women. Obesity level are rising in all socio-economic group, and some groups are more affected than others. This study analyze the correlation between percentage of body fat and socio-economic factors among women in rural area. **Methods:** A cross-sectional study was conducted on 112 women aged 45–59 years old in Cianjur District, West Java, Indonesia. The measurement of body weight and fat composition used Bioelectrical Impedance Analysis (BIA). Body height was measured by stature meter. All measurements were done twice in repetition. Socio-economic status were asked by a questionnaire. The correlation between variables were analyzed using Pearson. **Results:** The prevalence of high body fat percentage was 57.1%. The results indicated that non-food expenditure was higher than food expenditure.The average of income per capita was IDR 507,642 and the average of household expenditure per capita was IDR 491,056. Income (p < 0.05) and expenditure (p < 0.05) per capita were significantly correlate with body fat percentage. **Conclusion:** There was a high prevalence of high body fat percentage among women in rural area. Women in rural area with high income needs to pay attention on their diet in order to decrease the prevalence of obesity.

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A Mixed-Method Study of Long-Term Adherence to Healthy Diet and Physical Activity Recommendations Among Chinese Overweight and Obese Adults

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Keywords: Lifestyle modification · Adherence · Psychological factors · Weight management · Obesity · Adult

Background/Aims: This mixed-method study aimed to explore the psychological predictors of long-term adherence to healthy diet and physical activity (PA) recommendations in a community-based lifestyle modification program among Hong Kong Chinese overweight and obese adults. **Methods:** Chinese overweight and obese adults newly enrolled in a self-financed, culturally appropriate lifestyle modification program in Hong Kong were recruited between April 2014 and May 2015. Quantitative data on psychological factors (knowledge, self-efficacy, motivation and stage of change) were collected at baseline and 10-month using validated questionnaires. Adherence to healthy diet and PA recommendations at 10-month were assessed using dietary and PA records. Qualitative data on their experience and opinions towards the program were collected by means of semi-structured interviews and observation. **Results:** A total of 140 and 26 participants completed the quantitative and qualitative studies, respectively. They reported an overall high level of dietary adherence but low PA adherence. Multivariate analyses revealed that changes in nutrition knowledge and diet stage of change were significant predictors of dietary adherence while changes in PA self-efficacy and PA stage of change were significant predictors of PA adherence. The qualitative findings suggested that the support from therapists enhanced participants' knowledge and self-efficacy. Participants with high adherence adopted the diet and PA recommendations in their daily lives. The findings of this study help to fill in the knowledge gap of factors related to long-term maintenance of lifestyle changes. On the practical level, the findings have important implications for health care professionals offering individualized lifestyle advice for weight management.

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Alpha-Amylase Inhibitory Activities, Bioavailability and Glycemic Index of Horse Gram and Cereal Mixed Porridges

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Keywords: Bioavailability · Glycemic index · Horse gram

Background/Aims: Foods developed in combinations of cereals and legumes show protective mechanisms against degenerative diseases including diabetes mellitus. Horse gram, an underutilized legume has shown beneficial effects in management and prevention of several non-communicable-diseases (NCDs) due to the nu-

tritive and non-nutritive components. Objectives of the reported study were to determine the alpha- amylase inhibitory activities (AAIA) and bioavailability of phenolic compounds and glycemic-index (GI) of porridges prepared using horse gram and several cereals. **Methods:** Two porridges were developed in combination of horse gram with finger millet (FMHP) and rice variety AT 311 (RHP). Phenolic extracts of the cooked porridges were determined for AAIA using a modified starch iodine protocol. Extractions of two porridges were obtained after subjected to in vitro digestion, different gastric pH conditions and intestinal digestions to determine the percentage bioavailability of phenolic compounds. Extracts were used to determine total phenolic content (TPC), total flavonoid content (TFC) and antioxidant activity (AOA) using 2, 2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay (DRSA). **Results:** GI of two porridges was tested using twelve healthy normo glycemic subjects and statistically analyzed using Prism Pad 7.03. AAIA of FMHP and RHP were 73.4 and 31.5%, respectively. TPC of bioavailable fractions of FMHP and BRHP were 65.9 and 41.3%. DRSA of FMHP and BRHP were 78.4 and 31.5% respectively. GI of FMHP and BRHP were 45 and 55, respectively. **Conclusion:** There is a potential of using horse gram and cereals mixed porridges as effective ways in managing degenerative diseases such as diabetes mellitus.

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Exploring Physical Activity and Sedentary Behaviours of Kindergarten Teachers: Needs Assessment for Toybox Study Malaysia

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Keywords: Children · Kindergarten · Physical activity · Sedentary behaviour
Background/Aims: Lack of physical activity and sedentary behaviour have been linked to childhood overweight and obesity. ToyBox Study Malaysia is a preschool intervention programme that incorporates regular sessions of active play and sedentary break activities to help improve children's physical activity. Thus, this study aims to obtain an understanding of kindergarten teachers' physical activity behaviours and perception towards active learning environments prior to implementing the ToyBox programme. **Methods:** Focus group discussion (FGD) was conducted with 14 kindergarten teachers from Kuala Lumpur and Selangor. A trained moderator facilitated the FGD sessions using a semi-structured interview guide while a rapporteur took notes. The sessions were audio-recorded and transcribed verbatim. Data were coded and analysed by at least two researchers and verified by senior team members. **Results:** Most teachers agreed that they regularly allocate between 15 minutes to 3 hours for physical activity, which includes individual exercise, such as jogging and swimming, as well as group activities, such as playing netball or Zumba. On the other hand, all teachers reported daily screen time of 1–3 hours, including use of mobile phones and tablets, as well as watching

television. The teachers reported already implementing 2–3 physical education sessions weekly, and were open to conducting sedentary break activities with their students. In conclusion, although most teachers reported doing regular physical activity, all of them also had high amounts of sedentary screen time. **Conclusion:** Encouragingly for the implementation of ToyBox Study Malaysia, most teachers were enthusiastic about increasing physical activity sessions and executing sedentary break activities in their kindergarten settings.

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Beliefs, Ideologies and Representations of Food in Rural Aging

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Keywords: Nutrition · Aging · Anthropology · Qualitative research · Health
Background/Aims: Population aging is one of the central issues on the political agenda of the 21st century. The social implications have an impact on aspects such as labour relations, health and welfare systems, pension policy or family models. The understanding of food ideologies and practices in rural populations is a crucial issue in health policies and interventions. The research is oriented to describe cultural food practices and their association with ideologies, representations, supply systems and availability. This work was supported by the 4IE project (0045–4IE-4-P) funded by the Interreg V-A España-Portugal (POCTEP) 2014–2020 program. **Methods:** The methodological proposal resides in a mixed type of research through diverse techniques, such as standardized questionnaires, discussion groups, food practice surveys or semi-structured interviews. This work includes fieldwork and participant observation to collect testimonies and descriptions of food practices, supply processes or population representations. **Results:** Two main categories emerge in our results. First, the problems of access to food, the circulation of food is conditioned by a structural framework, so it is crucial in the diagnostic phase. Then, the mapping in the study areas for a variable representation of distances and difficulties for access to food indicate the importance of factors such as functionality, but also social position or gender. **Conclusion:** The notion of "healthy" of this population group is far from the medical and nutritional prescriptions. It is essential to take these qualitative analyses into account when developing public health policies that improve the quality of life of the elderly in rural areas.

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Effects of Fresh Coconut Milk Oil Consumption on Blood Pressure and Vascular Functions in Middle-Aged Male Rats

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Keywords: Coconut oil · Blood vessel · Nitric oxide · H2S
Background/Aims: We previously reported that dried fresh coconut milk consumption for 6 weeks caused up-regulation of eNOS and CSE with increased production of NO and H_2S from the blood vessels of middle-aged male rats. Since the main components of the coconut milk are oil (70%), protein (20%) and sugar (4.5%), this study aimed to clarify whether coconut oil, the major constituent, is the active component responsible for these effects. **Methods:** Coconut oil was isolated from dried fresh coconut milk by centrifugation, and was orally gavaged to middle-aged male rats (1 or 3 ml/kg) for 6 weeks. The same volumes of distilled water were given to the control group. At the end of treatment, basal blood pressure, heart rate, fasting serum lipid profile, body and liver lipid accumulation, and vascular function of isolated thoracic aortic rings of each rat were measured. **Results:** In comparison to control, at dosage of 1 ml/kg there were no changes in any parameters studied. When the dosage was increased to 3 ml/kg, there were no changes in basal blood pressure, heart rate, body and liver lipid accumulation, or fasting lipid profile. However, it caused increased NO and H_2S production from blood vessels to attenuate vasoconstriction to phenylephrine with increased vasodilatation to acetylcholine. The eNOS and CSE protein expressions of the blood vessels were also increased. **Conclusion:** These results suggest that the coconut oil in the present study might be the component responsible for the above effects of coconut milk.

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Active Constituents of Sesame Extract and Evaluate Anti-Inflammatory for RAW264.7 and TJP-1 Cells

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Keywords: RAW 264.7 ,THP-1, sesamin, sesaminol, anti-inflammatory

Background/Aims: Sesame is a natural nutrient including sesamin and sesaminol. At present, due to the increase in the number of global industrialization and human activities, environmental pollution and exposure to hazardous chemicals, these inflammations have become a major problem now. This may also be attributed to the increase in the number of emerging infectious diseases and the virulence factors of infection. Safety and effective drug development for the treatment of inflammation is an important development priority today, as inflammation can lead to many harmful health problems, and in the past few decades, a large number of anti-inflammatory natural products have been isolated from natural sources. Sesame contained rich in lignan compounds, and its main active constituent is sesamin and its lignan derivatives. Therefore, the purpose of this study is to extract the active constituents of sesame extract and evaluate anti-inflammatory using RAW264.7 and THP-1 cells. **Methods:** The sesamin and sesaminol were successfully isolated and purified. MTT assay of sesamin and sesaminol was performed by RAW 264.7 and THP-1 cells for cytotoxicity test. **Results:** The results showed that sesamin concentration at 100 µg/ml, RAW 264.7 cell IC50 16% and THP-1 cell IC50 24%, sesaminol concentration at 100 µg/ml, RAW 264.7 cell IC50 13% and THP-1 IC50 36%. **Conclusion:** It was found that both of sesamin and sesaminol have no cytotoxicity for RAW 264.7 and THP-1 cells.

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"Internet +" Basad Exercise and Nutrition Intervention Improved Overweight and Obesity in Chinese White-Collar Workers

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Keywords: Internet + · Exercise and nutrition · Obesity · White-collar workers
Background/Aims: Overweight and obesity are associated with a range of chronic diseases and have become a major global health concern. With the progress of Internet+ technology, electronic and Artificial intelligence healthcare has emerged, providing new tools and methods for weight management. **Methods:** We conducted 3-month open, self-controlled clinical trial among 305 participants aged 20 to 60 years to assessed the feasibility and effectiveness of a lifestyle weight management program among white-collar workers through information technology (IT)-supported platform and APP client and wearable prescription wrist watch. Each personalizing exercise prescription was loaded in the wrist watch carried by participant to instruct and monitor exercises, dietary prescription and instruction were given in APP. **Results:** After 3 months intervention, 273 participants completed the exercise program with an exercise compliance rate of 89.5%. Weight or body mass index decreased by 2.2% among 305 overweight and obese participants, with a reduction of 3.2% in waist circumference and 1.9% in body fat percentage (p<0.05). About 68.4% of the overweight and obese participants experienced weight loss after intervention, with an average decrease of 3.5% (2.8 kg, <0.001), and 20.9% of them achieved weight loss

≥5%. **Conclusion:** Detection rate of hypertension, hyperglycemia, and hyperlipaemia was significantly lower and the lifestyle of all participants significantly better than before. In conclusion "Internet +" basad exercise and nutrition intervention was practicable and effective on weight loss and controlling the risks of weight-related chronic diseases in overweight and obesity working groups.

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The Role of Diet and Blood Type in Management of Stress – A Preliminary Study in a Multinational Group in Thailand

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Keywords: Diet · Blood types · Stress
Background/Aims: Stress is a normal part of life and our bodies are designed to cope with it. Modern life often subjects us to constant degree of stress which piles up and takes our nervous systems. Eating the wrong foods can be hard on the body while adhering to blood type diet enables it to work more efficiently. **Methods:** The present study was designed to compare the stress level in a multinational group and understand, if possible, how diet and blood type might help in the management of it. A stress scale and other demographic and food-choices questionnaires were administered to 93 individuals (36 men and 57 women) with ages between 20–60. **Results:** Low level stress was found in 21.5% of the participants, average level stress affected 45.2% of them, while 33.3% displayed high level of stress. The highest level was found in the age group 30–50. Women were found to be more stressed than men. Blood type was found to influence the way individuals deal with the stress-type A being the most sensitive while type O the least sensitive. Wrong eating patterns common to most of the modern societies are shown to influence in great measure the outcome of stress. **Conclusion:** By learning how to manage correctly the negative factors-especially in the dietary area and regardless the geographical location-the health and wellness can be easily secured.

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Effectiveness of Various Factors on Athlete Physical Fitness in Sports Centre West Sumatera, Indonesia

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Keywords: Fitness · Eating behaviour · BMI/U · Physical activity · Macro nutrition intake · Hemoglobin level
Background/Aims: Athlete's achievements can be achieved with a high level of fitness. Fitness levels can be influenced by various factors, such as age, gender, genetics, smoking habits, rest,

exercise intensity, nutritional factors that include eating behaviour, food intake, and BMI/U and health status such as levels Hemoglobin in the body. This study aims to determine the risk factors for the level of fitness of athletes in the UPTD of Sport in the West Sumatra Province. **Methods:** This research used cross sectional design. Samples with purposive sampling method with total sample 106 athletes. Data analysis using univariate, bivariate (Chi Square and Fisher Exact Test) and multivariate (multiple logistic regression). **Results:** There were 78.3% athletes has good fitness level. Good eating behavior (54.7%), normal BMI/U (81.1%), adequate energy intake (28.3%), carbohydrate (40.5%), fat (57.5%), protein (61.3%), and normal athlete's hemoglobin level (92.9%). There is a relationship between BMI/U (p = 0.013) with fitness level and there is no correlation between eating behaviour (p = 1.00) and fitness level, there is a correlation between hemoglobin level and fitness level (p = 0.011). The multivariate test results showed that the confounding variables of eating behaviour were energy, carbohydrate, fat and protein intake, confounding BMI/U variables were physical activity and energy intake.Fitness levels of athletes in the UPTD West Sumatra High Sports Obedience. **Conclusion:** Eating behaviour has no relationship with fitness, BMI/U and hemoglobin levels have a relationship with athlete fitness. For athletes it is recommended to always maintain fitness both in terms of exercise and nutrition.

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Towards an Understanding of Encouraging Better Food Choices for Chinese Consumers with Metabolic Health Issues

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Keywords: Metabolic health · Dual processing theory · Chinese consumers
Background/Aims: The New Zealand Government has embarked upon 10 years High Value Nutrition national science challenge (HVN) that aims to support the New Zealand food and beverage export sector develop globally competitive food and beverages with scientifically validated health benefits for consumers in the major export market of China. Like many nations, China is struggling with increasing obesity and metabolic health issues. **Methods:** To support this challenge a consumer-centric approach has been undertaken whereby New Zealand researchers have taken a multi-modal methodological approach, conducting focus groups and in-home interviews in China with consumers suffering from gut issues; metabolic issues; obesity; and/or immunity issues. In depth interviews were also conducted with medical doctors specialising in metabolic diseases. **Results:** This paper will report on the interpretation of interviews with consumers concerned with metabolic issues. These consumers have had a medical diagnosis of type 2 diabetes and often high blood pressure and high cholesterol levels. Employing theories of dual processing in decision making, the difficulties consumers are facing in making improvements to their diets will be outlined, along with their responses to alternative therapies and interventions which may increase their compliance with medical advice. The research extends previous

research on consumers' food choices by exploring the role of different factors in activating either the spontaneous route or the deliberate route in food consumption. **Conclusion:** By considering the roles played by both the emotional route to consumption and the cognitive route to consumption and the environmental triggers for both, the research provides practical marketing implications.

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Health Benefit Perception of Plum Mango (*Bouea macrophylla* Griff.) Leaves by Sundanese

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Keywords: Gandaria leaves · Health benefit · Plum mango · Sundanese Indonesia

Background/Aims: *Bouea macrophylla* Griff. or plum mango is a tropical fruit tree native to Southeast Asia and its young leaves usually consumed as vegetables by sundanese in West Java, Indonesia. The objective of this study was to analyze the health benefit perception of plum mango leaves consumption by sundanese in West Java. **Methods:** Design for health benefit perception survey was a cross sectional study, involving 60 adult female respondents age 30–48 years old whose selected purposively from sundanese reside in Bogor rural area. **Results:** According to survey result, only 20% of respondents who had experience in consuming plum mango leaves and 11.7% consume this vegetable routinely. Majority of respondents stated that this vegetable is difficult to obtained. Majority of respondents (81.7%) agree that health benefit was the motive to consume plum mango leaves. As much as 25% of respondents agree that this vegetable has anti-diabetic potency. **Conclusion:** Majority of respondents (90%) agree if this vegetable developed into functional food.

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Effect of Leucine-Enriched Essential Amino Acid Supplementation on Muscular Fatigue and Inflammatory Cytokines in Wheelchair Basketball Players

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Keywords: Wheelchair basketball · Muscular fatigue · Inflammatory · Leucine-enriched essential amino acid mixture (LEAA)

Background/Aims: Leucine-enriched essential amino acid (LEAA) supplementation has been shown to potentially reduce muscle fatigue and inflammation. However, the LEAA ingestion effects underlying this observation are unknown after intense exercise in wheelchair basketball players. We aimed to investigate the effects of LEAA supplementation, level of muscle fatigue, and inflammatory cytokines in wheelchair basketball players after basketball game and interval training. **Methods:** Ten wheelchair basketball players aged 34.5 ± 8.9 years and with a lean body mass of 34.3 ± 10.0 kg, who had spinal cord injury and amputation were recruited. Nine among 10 athletes participated in the final test, while one athlete was not able to participate due to injury. Nine athletes were given LEAA supplements (12.0 g/day) or placebo treatment in a double-blind, randomized, and crossover experiment. We measured the variables related to muscular fatigue and inflammatory response before the intense exercise and 4 days after recovery. **Results:** The significant effect of LEAA supplementation was inhibition of circulating IL-6 levels in the LEAA-treated group compared with the placebo group (P < 0.05). However, no changes were observed in the TNF-α and creatinine kinase levels. Moreover, analysis of variance analysis showed no significant difference in the relative values of muscle soreness. However, the effect size analysis with Cohen's d reported a significant improvement in the relative values of whole body and back muscle soreness. **Conclusion:** Our results revealed that LEAA supplementation before and after intense exercise could be helpful in reducing muscular soreness and inflammatory response in wheelchair basketball players.

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The Effect of Tempe Drink Intervention on Malondialdehyde and Superoxide Dismutase in Hypercholesterolemic Subjects

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Keywords: Hypercholesterolemia · Malondialdehyde · Superoxide dismutase · Tempe drink

Background/Aims: Low density lipoprotein in hypercholesterolemic subject is easily oxidized then increase Malondialdehyde (MDA). One of the indicator to treat MDA is Superoxide Dismutase (SOD) through the consumption of food containing antioxidant. In Indonesia, soybean is very prevalent processed into tempe which contain isoflavon. The aim of this study was to analyze the effect of tempe drink intervention on MDA and SOD in hypercholesterolemic subjects. **Methods:** This study used randomized controlled trial design with 51 males and females subjects who were employees of Bogor Agricultural University. The inclusion criterias were adults aged 25–55 years, not being menopause and pregnant, total cholesterol ≥ 200 mg/dL and signed informed consent. The subjects were divided into three treatment groups-Tempe Drink of A (TDA) formulated from local sprouted soybean, Tempe Drink of B (TDB) formulated from imported soybean, and control. The tempe drink was given three glasses a day for four weeks, contained at least 25 g of protein/day. The control group was not given the tempe drink. The blood for analyzing MDA and SOD were collected from vena after fasting, before and after intervention. **Results:** The results from analysis of variance showed that both TDA and TDB decreased MDA and increased SOD of subjects significantly, respectively 0.7 nmol/mL and 0.5 nmol/mL; 1.4 U/L and 0.9 U/L, though there was no significantly

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different on the effect of TDA and TDB on SOD of subjects compared to control subjects. **Conclusion:** This implies that tempe drink had beneficial health effect on lowering MDA and increasing SOD in hypercholesterolemic subjects.

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Attitudes and Beliefs Influencing Healthy Eating and Physical Activity Behaviors among Mothers of Children in Singapore: A Cross-Sectional Study

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Keywords: Healthy eating · Physical activity · Behavior · Theory of planned behavior

Background/Aims: Parental involvement is recommended to enhance effectiveness of lifestyle interventions focusing on behavioral modifications that encourage weight management in children and adolescents. **Methods:** We investigated to what extent different constructs of the Theory of Planned Behavior (TPB) are influencing healthy eating behavior among Singaporean mothers of children 3–12 years old. Healthy eating behavior of 716 mothers (358 of pre-preschoolers and 358 primary school students) was assessed using the TPB constructs (intention, attitude, subjective norm, barriers, self-efficacy and perceived behavioral control [PBC]). Bi-variate correlations among TPB constructs were tested using Pearson's correlation test. Associations between TPB constructs and healthy eating behavior were examined using multivariate generalized regression models. **Results:** More than 80% of children consumed less than 1 glass of dairy, 2 servings of fruit and vegetables per day. More primary school children consumed less than 1 glass of dairy/day compared with the preschoolers (48.9% vs. 26.3%, $p < 0.001$). Primary school children's healthy eating behaviors were correlated with mother's PBC if she had adequate discipline ($\beta = 0.40$, $p = 0.001$), self-efficacy ($\beta = 0.35$, $p = 0.01$) and a lower barrier that healthy food does not satisfy hunger ($\beta = -1.16$, $p < 0.001$). Barriers that significantly reduced preschoolers' food intake were lack of motivation in mothers ($\beta = -1.13$; $p < 0.001$) and children ($\beta = -0.49$; $p = 0.02$), lack of satiety ($\beta = -1.06$; $p = 0.02$), difficulty in changing child's eating habits ($\beta = -0.58$; $p = 0.03$), lack of family support ($\beta = -0.62$; $p = 0.03$). **Conclusion:** The findings will help formulating guidelines and programs targeted specifically at mothers to increase their engagement in improving their child's healthy eating behaviors. Interventions should focus on improving mother's PBC, self-efficacy and reducing barriers.

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"Kids Get in Shape with Nature": A Systematic Review Exploring The Impact of Green and Blue Spaces on Childhood Obesity

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Keywords: Physical activity · Eating behaviour · Child obesity · Environmental health

Background/Aims: Green and blue spaces (GABS) are vital components of sustainable and healthy cities and communities. Evidence suggests that GABS positively affect population health and well-being. However, few studies examine GABS influence on childhood obesity. This systematic review investigates the impact of GABS on childhood obesity particularly on children's physical activity and eating behaviour. This also examines the feasibility of GABS as an obesity prevention strategy in developing countries, such as the Philippines. **Methods:** The search protocol identified 544 studies from PubMed, Medline, PsycINFO, CINAHL, and Web of Science. A two-tier screening process using PRISMA framework identified 16 studies which underwent quality analyses using the National Heart, Lung, and Blood Institute (NHLBI) and Critical Appraisal Skills Programme (CASP) tools. Data were interpreted using thematic analysis and narrative synthesis. **Results:** Screened studies show varying sociodemographic characteristics of sampled population which are located in urban and rural settings. The influence of GABS on children's physical activity and eating behaviour depend on the type, location, proximity, foliage, facilities, and activity types that interplay with gender, ethnicity, and parent-child relationship. **Conclusion:** This review demonstrates the significant effect of GABS on children's physical activity and eating behaviour. GABS provide children with safe venues for socialisation and long, intensive, and enjoyable physical activity. Additionally, GABS positively influence children's perceptions on vegetable consumption supporting healthier eating behaviour. These spaces have the potential to eradicate childhood obesity in the Philippines if policy, social, economic, environmental, and organisational considerations are addressed.

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Hydration During Summer Practice: Comparison of Endurance Sports and Ball Sports

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Keywords: Heatstroke · Dehydration rate · WBGT · Humidity

Background/Aims: Summer in Japan is very hot and humid. So many people suffer from heatstroke every year. Hydration is important for preventing heatstroke during sports. In the present study, we surveyed and compared endurance sport and ball sport. **Methods:** Surveys were conducted at sport practices in August. Subjects were 13 female long distance runners and 59 members of

a male soccer team. As survey items, temperature and humidity were measured with a dry-bulb thermometer and hygrometer and Wet Bold Globe Temperature (WBGT). We surveyed volume of water consumed, weight measurement, and frequency of nutrient consumption. **Results:** The proportion of athletes with a dehydration rate of 2% or more was 46% (29°C, 57%) and 0% (24°C, 89%) between 6:00–6:59 a.m ,64% (36°C, 45%),18% (32°C, 45% and 29°C, 72%) between 11:00–11:59 a.m. for endurance sports. The same proportion was 4% (27°C, 80%) and 10% (32°C, 51%) from 4:00–6:00 p.m. for ball sports. For endurance sports, almost all runners who drank water during practice had a dehydration rate of 2% or less. For ball sports, some players drank too much water. The timing for hydration was "when I felt thirsty" for 50%. Discussion: Regarding the relationship between temperature and humidity, the dehydration rate was high during high heat and low humidity. These results suggest that guidance is needed to ensure appropriate hydration and prevent heatstroke. **Conclusion:** We need making a manual for temperature measurements before practice, and determine the drinking interval and amount during practice may help prevent heatstroke.

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The Relationship between Body Mass Index, Body Fat Percentage, and Dietary Intake with Muscle Fatigue in Adolescent Football Players

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Keywords: Sport nutrition · Football player
Background/Aims: It is important for football players to maintain muscle strength through entire the match. The aim of this study was to investigate body mass index (BMI), body fat percentage (%BF), dietary intake (energy, carbohydrate, and protein) and its relationship with muscle fatigue among adolescent football players. **Methods:** This was a cross-sectional study involving 26 football players aged 15–17 years. BMI was determined using BMI-for-age percentile (kg/m^2).%BF was analysed using Bioelectrical Impedance Analysis (BIA) and categorized using bodyfat curves for children. Dietary intake was assessed using 3x24 hours dietary recall. Running-Based Anaerobic Sprint Test (RAST) was conducted twice and averaged to identify muscle fatigue. We used Pearson test to evaluate the significance relationship between variables. **Results:** The results showed that most subjects had healthy weight (17.6 ± 1.82 kg/m^2), good diet pattern (energy 99.1 ± 14.3%, carbohydrate 92.9 ± 9.5%, protein 96 ± 23.4%), but underfat (6.8 ± 2.1%). Negative correlations were found significantly in: muscle fatigue and BMI (r = −0.393, p = 0.047), as well as%BF (r = −0.458, p = 0.019). Meanwhile, there was significant correlation in energy intake and muscle fatigue (r = 0.538, p = 0.005). Carbohydrate and protein intake did not show any significant relationship with muscle fatigue however. **Conclusion:** In conclusion, to reach the highest performance during the game, it is essential for football players to maintain BMI and%BF at normal range, as well as consuming adequate amount of food containing energy in daily basis.

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Effects of Green Tea and L-Theanine on Psychological and Physiological Anti-Stress Responses among Healthy Female Students

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Keywords: Green tea · L-theanine · Anti-stress · Electroencephalogram (EEG) · Salivary cortisol
Background/Aims: Tea has been a very popular beverage around the world for centuries. Recently, green tea has become renowned for the health benefits of its amino acid components, such as L-theanine. Green tea is traditionally known to induce mental clarity and relaxation. L-theanine is the major amino acid in tea leaves (*Camellia sinensis L.*) and has significant anti-stress effects. However, to date there are no clear evidence-based results regarding the health effects of L-theanine. Levels of amino acid components in the tea samples were measured using HPLC. **Methods:** A cross-over open study was conducted. Seven healthy females participated in the study. Three separate trials were performed in which the participants ingested one of three samples (water as a control, green tea and 20 mg L-theanine) each day. Electroencephalogram (EEG) measurements were performed using a EEG brain mapping instrument and heart rate (HR) were measured. Salivary cortisol was measured as a stress marker and the POMS used for subjective ratings on mood. All measurements were performed prior to and post-intake samples. **Results:** The largest amount of L-theanine was obtained from green tea "Gyoku-ro". L-Theanine intake resulted in a reduction in the HR and salivary cortisol levels. Human brain alpha activity showed a significant increase after ingestion of L-theanine, as compared with green tea and placebo. Green tea intake slightly reduced HR and increased cortisol level. **Conclusion:** The POMS results revealed no significant changes in mood. The present study revealed that L-theanine led to relaxation while green tea intake was not associated with relaxation.

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Irregular Weight Monitoring Associated With Overweight-Obesity In Adolescent (High School Student) at Bekasi

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Keywords: Balanced nutrition · Overweight · Obesity · Adolescent
Background/Aims: Adolescents are a group that is susceptible to nutritional problems. One of the problems in adolescents is the incompatibility of actions related to food selection. An unbalanced diet will affect nutritional status, hence a guide is needed in taking action in the selection of food by considering the principle of balanced nutrition. This study aims to determine the relationship of balanced nutrition practices with the incidence of obesity in adolescents. **Methods:** This was an observational study with cross sec-

tional design. The independent variables in this study were diverse food consumption, hygiene behavior, physical activity and normal weight monitoring (four principle of balanced nutritional guidance) while the dependent variable in this study was obesity. The subjects of this study were 192 high school students. Data were collected by using semi quantitative-Food Frequency Questionnaire (SQ-FFQ) to assess food consumption, IPAQ short form to measured physical activities, and valid questionnaire to know hygiene and weight monitoring behavior. Data analyzed by using chi square test. **Results:** Research showed that there were 19.8 percent overweight and obesity, 100 percent of dietary consumption was inconsistent with Balanced Nutritional Guidance, 53.6 percent had good hygiene behavior, 52.1 percent had medium activity and 63 percent had irregular weight monitoring. **Conclusion:** There was a relationship between weight monitoring and obesity (p < 0.05) and no relationship with other principles. Adolescent had poor pattern of food consumption and irregular weight monitoring that caused overweight-obesity. It suggestion that adolescent must had regular weight monitoring to control their nutritional status.

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Food Consumption Patterns and Changes in Indonesia Forested and Deforested Areas

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Keywords: Food consumption · Food consumption pattern · Forest · Deforestation

Background/Aims: Indonesia is undergoing a modernization of diets, which coincided with rapid deforestation and transformation of Indonesian landscapes. Previous studies have found that forest cover is associated with dietary diversity and nutritional status. **Methods:** Using available data from the Global Forest Watch website, we selected the 50 regencies with the most, and the 50 regencies with the least deforestation. Using two rounds of Indonesian National Socio-economic Survey (SUSENAS) data from years 2008 and 2017 on weekly household food consumption, we explored differences in food consumption patterns between these two groups. **Results:** We found that households in forested and deforested areas are reducing their consumption of rice-based staples, other staples, vegetables, fresh legumes, fresh ruminant meat, wheat-based staples, towards more caloric beverages, preserved meat, avian meat, eggs, ready to eat instant noodles, and savory snacks. Although the trends are similar, but the recent consumed amounts of wheat-based staples, caloric beverages, sugar, salt, instant ingredients, and instant noodles, were higher in deforested than in forested areas. And consumption of other staples, milk, green leafy vegetables, vitamin-A rich vegetables and fruits, total vegetables and total fruits, were higher in forested areas than deforested areas. Our findings suggest that modernization of diets is happening all over Indonesia. However, households in areas with less deforestation consumed better quality diets in several aspects compared to those living in areas with more rapid deforestation.

Conclusion: Deforestation may bring higher incomes, but it also seems to be associated with some of the negative dietary attributes of more modern lifestyles.

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HIIT and Aerobic Training Effect on Cardiorespiratory Fitness among College Students

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Keywords: HIIT · Aerobic · Training · Cardiorespiratory fitness

Background/Aims: The rise of obesity and non-communicable disease problems has become public health concern around the world. As the association between physical activity and the increased risk of obesity and NCD solidified, WHO recommend healthy adult should accrue at least 60 minutes of moderate activity daily. HIIT and aerobic exercise combined with balance nutrient intake are believed to be one of the best way to improve cardiorespiratory fitness and overall health. This study was designed to examine which training provides the most effective on improving cardiorespiratory fitness and factors related to it. **Methods:** Twenty-nine healthy male and female college students were randomly assigned into two groups 1) HIIT training and 2) Aerobic training for seven consecutive days, cardiorespiratory fitness was assessed using bleep test before and after intervention, 24 Hour food recall was used for energy and nutrient intake, and BMI for nutritional status. **Results:** Both aerobic and HIIT training resulted in significantly increased cardiorespiratory fitness p < 0.05, but there are no significant different on cardiorespiratory fitness score between HIIT and aerobic group. **Conclusion:** BMI, energy and carbohydrate intake were significantly correlated to cardiorespiratory fitness level among both groups.

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Influence of Nutrition Education Using a Poster of Nutrition Labeling on Food Selection by Japanese University Students

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Keywords: Nutrition education · Nutrition labelling · Behavioural change

Background/Aims: This study examined the influence of nutrition education using a poster of nutrition labelling on food selection focused on beverages. **Methods:** The study population included 327 university students majoring in food and nutrition (male, n = 37; female, n = 290; age, 18–21 years). A poster on nutrition labelling (focusing on beverages) was posted in a university corridor that students frequently use between May and July 2018. A self-administered questionnaire survey on the usage of nutrition labelling in food selection was conducted in May and July. **Results:** The percentage of students who saw the poster was 18.3%. The contents of the poster were understood by 96.6% of the students who saw it. Furthermore, 84.7% evaluated whether their daily beverage consumption was healthy or not, and 27.1% answered, "I know that I cannot choose healthy beverages and I will change how I select daily beverages." In the group who saw the poster, 10.3% and 23.6% answered, "I always purchase foods and beverages with reference to nutrition labelling" before and after the posting of the poster, respectively. In contrast, in the group who did not see the poster, 8.0% and 9.7% gave this answer before and after the posting. **Conclusion:** The poster on nutrition labelling led to the self-assessment of daily beverage consumption, but it was not possible to sufficiently encourage behavioural change. Since few people saw the poster, it is necessary to devise methods of improving its visibility, such as making a more visual poster.

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Effect of Low Impact and High Impact Exercise on Body Mass Index and Macronutrient Intake among Adult Women in Urban Area

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Keywords: Nutritional status · Macronutrient intake · Low impact · High impact

Background/Aims: The best strategy to prevent overweight and obesity is combination diet and exercise. Many studies stated that both low impact and combination impact may be an effective for promoting weight reduction and psychological well-being when combined with low energy diet; however, the effectiveness of these exercises is still conclusive. This study aimed to analyze the effect of low impact and combination impact exercise on body mass index and macronutrient intake changes among adult women in urban area. **Methods:** This is a quasi-experimental study with 34 adults women as a subject, and divided into two groups: low impact (n = 15) and combination impact (n = 19). The exercise was done in 30–45 minutes each session and last for 5 weeks. At baseline and end-line, sample's weight, BMI and nutrient intake (CHO, Protein, and Fat) was measure to assess the differences before and after intervention. **Results:** Weight changes after the intervention were 1.1 Kg on High Impact group while on combination exercise was 0.8 Kg. BMI changes were 0.5 on High Impact Group while on the combination group were 0.3. **Conclusion:** There are significant weight, BMI, Energy, Carbohydrate, Protein intake differences on high impact group and combination group (p < 0.05). These findings suggest that the high impact may be more effective than combination impact for weight loss among adult women in urban area

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Associations between Self-Esteem, Skipping Meal and Sleep Quality with Overweight and Obesity among University Students

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Keywords: Overweight · University student · Skipping meal · Sleep quality

Background/Aims: University students undergo significant lifestyle changes including living independently, coping with increasing academic demand and adjustment to new environment. Poor adjustment to new environment could contribute to lower self-esteem, meal skipping and experiencing poor sleep quality which may affect their body weight status. **Methods:** This cross sectional study aimed to determine the prevalence of overweight and obesity and its association with self-esteem, meal skipping behaviour and sleep quality among university students. A total of 240 undergraduates students (24.6% male and 75.4% female) with mean age of 21.22 ± 1.24 years from Universiti Putra Malaysia were recruited through simple random sampling. Respondents completed the Rosenberg Self Esteem Questionnaire, Eating Behaviour Questionnaire and Pittsburgh Sleep Quality Index. **Results:** Height and weight were measured and indexed into body mass index. The prevalence of overweight and obesity were 25.9% and 19.6% respectively. Binary logistic regression analysis (adjusted for gender and age) revealed that university students who skipped meal (OR = 4.55, CI: 1.03–20.12, p < 0.05) and had poor sleep quality (OR = 2.09, CI: 1.12–3.89, p < 0.05) were more likely to be overweight and obese. **Conclusion:** Lower self-esteem was not associated with their body weight status. Understanding modifiable behaviour associated with overweight and obesity enhanced the development of wellness program against development of overweight and obesity among university students.

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Low Intake of Protein Rich Foods and Depression and Anxiety Symptoms: Association among Adolescent Boys and Girls

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Keywords: Nutritional psychiatry · Depression · Anxiety · Adolescents · Diet

Background/Aims: Data on prevalence of mental health disorders indicates that 4.5% and 3% of the Indian population is suffering from depression and anxiety respectively. Research suggest that a poor quality diet (lacking in macro and micronutrients) may lead to deficiencies that are associated with depression and anxiety disorders (Jacka et al., 2012; Jacka et al., 2013). **Methods:** The present research was designed to study the prevalence & association of depression & anxiety with protein intake among adolescent boys & girls (aged 13–15 years) studying in public schools of Delhi. 546 adolescents participated in this cross-sectional study (selected from public schools in Delhi). For the assessment of depression and anxiety symptoms and dietary micronutrient deficiencies Child Behavior Checklist (CBCL; administered to the parents) and 24 hour recall and food frequency questionnaire (administered to the subjects) were used respectively. Adolescent Micronutrient Quality Index (AMQI) was further used to assess the micronutrient quality of the diets. Prevalence of depression and anxiety were 33.5% and 27.47% respectively. **Results:** Assessment of diets through AMQI revealed that low intake of protein rich foods like milk and legumes was significantly associated with higher mean scores of depression (p < 0.001) and anxiety symptoms (p < 0.001). **Conclusion:** This study highlight's the association of mental health with protein intake and micronutrient deficiencies among adolescents. It will also serve as a strategic tool for mental health prevention & management policies designed for adolescents. It also adds to the growing body of research in the area of nutritional psychiatry.

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The Effect of Ingesting Coconut Water (*Cocos nucifera L*) Mixed with Aren Sugar (*Arengapinnata*) and Isotonic Drinks on Physiological Characteristics during Basketball Games

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Keywords: Coconut water · Aren sugar · Physiological characteristic

Background/Aims: The study is intended to find out physiological characteristics when giving coconut water drinks mixed with aren sugar compared to isotonic drinks. **Methods:** Coconut water and aren sugar have been characterized by mineral content in the Pharmacy School Pharmacochemical Laboratory of ITB. A total of 1600 ml coconut water using a total carbohydrate of 6% per treatment for has been given for five times. The measured parameters were blood glucose levels and lactic acid levels. They were done by taking blood samples from capillary vessels four times in one treatment. The data then were analysed by using SPSS and Mann Whitney U-test. **Results:** Glucose levels of coconut water mixed with aren sugar at the match and 30 minutes after the match began in the treatment had a significant difference, increase or decrease, compare to the isotonic beverage at the confidence level α 0.05. Lactic acid levels in the treatment of coconut water mixed with aren sugar were lower than isotonic beverage treatments at the confidence level of α < 0.05, but not significantly. Urine Specific Gravity (USG) of the three treatments did not prove significantly different results, but coconut water mixed with aren sugar had the lowest USG value. **Conclusion:** The consumption of coconut water mixed with a 6% of total carbohydrate aren sugar is quite well in increasing blood glucose levels and delay fatigue, by measuring lactic acid levels parameters, compared to isotonic drinks, and therefore this drink is a relatively safe solution for replacing isotonic drinks.

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Environmental Impacts Related to Food Consumption of Indonesian Adults

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Keywords: Food consumption · Greenhouse gas emissions · Nutritional status · Indonesia

Background/Aims: The challenge for nutrition science is to understand strategies to enable a balance between healthy diets and sustainable food systems. This study was to quantify greenhouse gas (GHG) emission of food consumption related to different dietary preferences among Indonesian adults by body mass index (BMI). **Methods:** We used the existing food consumption survey databases. Dietary and anthropometric information were obtained from Total Diet Study (Studi Diet Total/SDT) in 2014 and Basic Health Research (Riskesdas/RKD) in 2013. The most consumed food items from 14 food groups were selected as representatives of rice, cassava, tofu, long beans, banana, chicken meat, chicken feet, mackerel tuna, chicken egg, condensed milk, palm oil, white sugar, shallot, and powdered coffee. The GHGs emission factors were acquired from Thai National Life Cycle Inventory Database. Food weight (gram), energy intake (kcal), and GHGs emission (kgCO2eq) from consumption of these food items were analyzed among BMI groups. **Results:** Annual GHGs emission by underweight, normal, overweight and obesity group were 724, 742, 741, and 719 kgCO2eq, respectively. The highest contributor of GHG was chicken meat (243 kgCO2eq) followed by rice as the staple food (171 kgCO2eq). Indonesian people in the obesity group consumed more food weight (p = 0.001) than other groups, however, no difference in GHGs emission was observed (p = 0.287). **Conclusion:** This finding suggested that the selection of food type plays a critical role in the environment and amount of consumption. Food choices of the population may ultimately result in impacts on the environment and have public health consequences.

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A Study on Body Mass Index and Nutrition for Female University Students in Tokyo

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Keywords: Female university student · Body mass index · Nutrition

Background/Aims: In Japan, admiration among young women for thin figures has led to them dieting, having an unbalanced diet, skipping meals, and acquiring other inappropriate dietary habits. According to the National Health and Nutrition Survey conducted in Japan in the year 2017 (Ministry of Health, Labor and Welfare,2017), 21.7% of women in their twenties are underweight. **Methods:** The subjects included 45 female university students in Tokyo. Physical stature (height and weight), physical strength (muscle strength, flexibility, instantaneous power, agility, and endurance), and nutritional intake were measured. **Results:** The mean age of the subjects was 19 years, height was 157 cm, weight was 49 kg, and BMI was 20 kg/m^2. Their mean daily caloric intake was 1845 kcal. Our investigation of physical strength indicated that the muscle strength of the participants was less. **Conclusions:** We believe the fact that there were no obese students in this cohort and none of the students regularly exercised and still exhibited only average physiques can be attributed to their dietary habits, which resulted in a decreased physical strength. The decrease in physical strength, in particular, contributes to the issue of whether or not a person regularly exercise. We would also like to see improved dietary habits as part of these efforts.

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Health-Related Factors having an Influence on the Changing of Rice Intake Selection for an Effective Diet Education

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Keywords: Rice · Diet education · Longitudinal study · Sustainable well-being

Background/Aims: Effective diet education in an appropriate stage is necessary to support people's sustainable well-being. Adding or changing staple food from white rice to whole grain cereals, which include rich nutrient density such as brown rice, might be effective for disease prevention. The purpose of this study was to clarify the characteristics of the person who changed or added other types of rice six months later ("rice change"). **Methods:** A basic study was conducted in 2016 for Japanese men and women, and a second survey was done to investigate whether the participants' rice intake selection was changed six months later. A total of 1,076 respondents (550 men, woman 526, 18–79 years old), excluding participants who were missing data of sex, age, health-check-ups, and except for the participants who ate white rice and did not mix other rice in baseline. For a logistics regression analysis, we used health-related factors which were shown significant relation (p < 0.05) to their behavior of "rice change". **Result:** The indicators of "Blood triglyceride levels ≧150 mg/d" (OR = 2.03, 95% CI: 1.15–3.58), "Fasting blood sugar level" (OR = 1.02, 95% CI: 1.01–1.03), "women" (OR = 1.99, 95% CI: 1.12–3.55), and "annual income" (OR = 1.37, 95% CI: 1.03–1.82) were significantly related to "rice change". **Conclusion:** The participants who changed or added other types of rice six months later had "Blood triglyceride level ≧150 mg/d" and high "Fasting blood sugar level". They might become a target for an intervention support.

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Effect of Omega-3 Fatty Acids and *Lactobacillus casei* on Fecal Microbial Profile of Highly Active Individuals: A Randomized Controlled Trial

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Keywords: *Lactobacillus casei* · Omega-3 fatty acids · Faecal microbial profile · Intense exercise

Background/Aims: Excessive exercise and inadequate recovery are known to increase physical and emotional stress. Stress negatively affects gut health by altering gut microbiota. Probiotics have shown to improve gut microbiota and overall health of the human host. While omega-3 fatty acids may have prebiotic potential, the synergistic effects of probiotics and omega 3 fatty acids have been understudied. We compared the effect of a 4-week consumption of *Lactobacillus casei* with or without omega-3 fatty acids on fecal microbial profile in highly active individuals. **Methods:** A total of 22 participants were recruited and randomly assigned to either group. 13 subjects in *Lactobacillus casei* group, received one bottle of culture drink contains 3.75 × 108 colony forming units of *Lactobacillus casei* Shirota strain daily and 9 subjects in *Lactobacillus casei* with 3 capsules of 650 mg omega-3 fatty acids each daily. Fecal samples were collected at baseline and at the end of trial. Each fecal sample underwent 100 times dilution, transferred onto the MacConkey, cetrimide, blood and Eosin Methylene Blue agar plates and incubated at 37°C for 24 hours. After incubation, bacteria were counted in each plate and identified by gram staining and biochemical tests. **Results:** In either group, there were no significant changes on the bacterial growth in all four types of agar plates between baseline and end of trial. **Conclusion:** The present results showed that a 4-week supplementation of *Lactoba-*

cillus casei with or without omega-3 fatty acids had no significant effect on fecal microbial profile among highly active individuals.

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Influence of Dietary Carbohydrate/Fat Balance on Obesity in Postmenopausal Model Mice

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Keywords: OVX · Obesity · Nutrient balance

Background/Aims: In postmenopausal women, visceral fat accumulation attributed to estrogen reduction increase the risk of diabetes, hypertension, and dyslipidemia. Low-carbohydrate and high-fat diet attracts attention to alleviate obesity, but the influence for obesity in elderly women is unknown. We investigated the influence of dietary balance on obesity using postmenopausal model mice. **Methods:** Ovariectomized (OVX) mice were fed diets with different energy balance for 12 weeks. The protein/fat/carbohydrate ratio of diets was 15/10/75 (Carbo75 group), 15/25/65 (Carbo65 group), or 15/40/45 (Carbo45 group). The experimental conditions were as follows: Exp. I: OVX, ad libitum. Exp. II: OVX, pair-fed; Exp. III: no operation, pair-fed. Abdominal μCT analysis was performed every four weeks. **Results:** Exp. I & II: In the Carbo45, the energy intake and body weight tended to be higher than those in other groups. The visceral and subcutaneous fat mass were significantly higher in the group with lower carbohydrate ratio. The visceral fat mass was remarkably increased in the Carbo45. Exp. III: There was no significant difference among the groups. **Conclusion:** In postmenopausal model mice, it was revealed that the visceral fat mass significantly increased in the group with lower carbohydrate ratio. It is suggested that taking low-carbohydrate diet for postmenopausal women is more likely to be inappropriate for maintaining health.

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The Degree of Interest of Japanese University Students in Nutrition Labeling

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Keywords: Nutrition labeling · Nutrition education · Eating habits · Health behavior

Background/Aims: In Japan, nutrition labeling of foods has been mandatory since 2015. We aimed to examine the relationship between Japanese college students' interest in nutrition labeling and their eating habits and health behavior. **Methods:** Four hundred forty university students who attended the Department of Food and Nutrition (male, n = 52; female, n = 388; age, 18–22 years) participated in this survey. A self-administered questionnaire survey was conducted in May 2018. In the questionnaire, we asked questions about the degree of interest in nutrition labeling, degree of health, diet experience, advantages and disadvantages of using nutrition label. **Results:** Thirty-one percent of the respondents indicated that they were concerned about nutrition labeling. Those interested in nutrition labeling were significantly more likely to obtain correct nutritional information (P < 0.001), and to have always checked nutrition labeling when buying foods (P < 0.001). Furthermore, the group tended to have a high proportion of individuals with diet experience (P = 0.051). Students who were interested in nutrition labeling often obtained correct information and used nutrition labeling when selecting food products. Furthermore, those who were interested in nutrition labeling were more likely to diet. **Conclusion:** Taken together, it was suggested that increasing interest in nutrition labeling and providing a method of utilizing correct nutrition labeling would enable university students to select healthy food products.

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Tendon of Jilin Sika Deer Extract Supplementation Improves Endurance Exercise Performance among Free Boxing Players

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Keywords: Tendon of Jilin Sika Deer extract (TDE) · Exercise performance · Drop jumps

Background/Aims: We demonstrated that Tendon of Jilin Sika Deer extract (TDE) supplementation in improving endurance exercise performance in free boxing players. **Methods:** Sixteen subjects wore indoor sneakers, shorts and sports bras. After warming-up, the subjects performed 200 repeated drop jumps (DJs) tests. The subjects stood on the force plate and immediately leaped up vertically with maximum force as quickly as possible. The instrumentation of kinetic and kinematic data was collected using BTS motion capture and analog data acquisition system (Bioengineering, Milano, Italy) and 4 force platforms (BTS P6000, BTS Bioengineering, Milano, Italy) at a 400-Hz sampling rate were used. A modified Helen Hayes marker set was used to identify the 7-segment rigid link model of the lower extremities. **Results:** TDE group exhibited significantly higher 200 repeated drop jumps performance compared to the placebo group (P < 0.05). **Conclusions:** We suggesting that TDE supplementation could be further considered as potential ergogenic aids combined with different nutrient strategy to enhance exercise performance for free boxing players.

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Knowledge, Attitude and Practice of Dietary Supplement Use among Young Athletes in Malaysia

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Keywords: Dietary supplements · Athletes · Knowledge

Background/Aims: Despite the concerns for dietary supplement (DS) use to result in doping infringements, little is known on the prevalence of DS use among athletes at grassroots level. This study examined the knowledge, attitude and practice of DS use among developmental athletes aged 16 to 21 years from sports institutes in Malaysia. **Methods:** A paper questionnaire was administered to collect information on sociodemographic and training background, knowledge, attitude and current use of supplements. A total of 936 athletes (60.2% males) aged 18.4 ± 1.5 years from strength and endurance, aquatic, team, skill, racket and combat sport categories with complete data were included in the analysis. Knowledge and attitude were scored from 0–100. **Results:** Over two-thirds (70.2%) of athletes used an average of 1.2 ± 1.0 types of DS in the previous six months, mainly in the forms of sports food and beverages (50.5%), vitamin and minerals (29.2%) and protein supplements (20.3%). Prevalence of DS use was associated with sex, ethnicity, level of education and sports category (p < 0.05). The mean knowledge was 30.4 ± 18.9, while DS users scored significantly higher than non-users (32.2 ± 19.2 vs. 26.3 ± 17.5). The average attitude score was 65.3 ± 6.2. **Conclusion:** Although DS use was highly prevalent, the knowledge and attitude toward DS was considered low in this large sample of developmental athletes. The findings suggest the need to educate on appropriate use of DS in sports among young athletes in Malaysia.

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Ancient Indian Wisdom to Combat Depression: A Threat to Mankind in Modern Times

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Keywords: Depression · Ayurveda · Vayu vicar · Vayu nad

Background/Aims: Depression is a leading cause of disability, lost productivity, and high health care expenditure all over the world. Our ancient age old system has remedies for this mental disorder too, which depends on the complex interplay of chemicals in the brain. These chemicals, known as, neurotransmitters such as Dopamine, Norepinephrine and Serotonin are responsible for the state of mind. When the VAYU NADI gets disturbed due to some imbalance, these neurotransmitters are poorly affected. There are certain herbs known in our ancient culture of medicine, which proved beneficial in such cases of mental disorders. One such herb is *BHANG – Canabis*. The inclusion of this herb along with some others such as *SHANKHPUSHPI Convolvulus pluricau-lis*, and *Brahmi Bacopa monnieri* with almonds. The neurotransmitters are increased by some complex carbohydrates and protein foods and promote the production of Dopamine and Norepinephrine. The investigation initially involved 20 people only and the results were encouraging. The *Bhang* leaves were processed initially, then dried to make into powder with *shankhpushpi* and *brahmi*. Usage of *TRIPHALA* was also recommended to the patients as it balances the *VATA, PITTA* and *COUGH*. According to *ayurveda*, the imbalance of *vata, pitta* and cough produces a number of physiological, psychological and mental disorders. Besides, *ASHWAGANDHA Withania somnifera* was also administered to such patients to boost strength. Case studies have proven the effectiveness of the herbs.

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Effects of Whey Protein Supplementation Prior to and Following Resistance Exercise on Body Composition and Training Responses

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Keywords: Protein supplementation · Training · Muscular strength · Muscular endurance

Background/Aims: The purpose of this study was to test that a protein blend supplement before and after resistance exercise training (RET) for 12 weeks, would be effective on muscular function. **Methods:** Eighteen participants were randomly assigned to a placebo (PLA) or protein blend supplement (PRO) groups. All subjects followed the same training routine, 3 times per week for 12 weeks. RET consisted of lower body (barbell squat, dead lift, seated leg extension, and lying leg curl) and upper body (bench press, barbell rowing, preacher bench biceps curl, and dumbbell shoulder press). A repetition was three sets of 10~12 times with 80% of one repetition maximum (1RM). Participants were provided with or without protein supplementation immediately before and after each exercise session. The protein supplement consisted 26.2 g of whey protein. Time course of change in body composition, blood hormonal response, muscle hypertrophy, muscular function (i.e., muscular strength and endurance) were monitored every 4 weeks. A two-way ANOVA with repeated measures ("exercise"×"supplement") was used to analyze the effects of supplement. **Results:** Protein supplement group had greater improvement in muscle hypertrophy and muscle function; higher muscle circumference, muscular strength and endurance than the placebo group. There was a difference in mean change between groups at 12 weeks. **Conclusion:** The findings from this study indicate that protein blend supplementation prior to and following resistance exercise can improve muscular function during resistance exercise in untrained young males.

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Relation of Bone Mass to Gene Polymorphism and Lifestyle Factors (Nutrition and Exercise)

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Keywords: Bone mass · Vitamin D receptor · Gene polymorphism · Multiple linear regression analysis

Background/Aims: The aim of the present study was to identify vitamin D Receptor (VDR) gene polymorphism and life style factors (nutrition and exercise) associated with bone mass in Japanese female college students. **Methods:** The subjects comprised of 317 female college students aged between 20 and 24 years, all of whom were living in the Kanto region at the time of the study. The subjects were asked what type of sport they used to play in their junior high school and high school days. The subjects' current nutrient intake was surveyed using Food Frequency Questionnaire Based on Food Groups (FFQG) Ver.3.0 software, an add-in software of Excel Eiyou-kun (Kenpakusha). The daily intake of three nutrients (calcium, vitamin D, and vitamin K) was calculated per 1,000 kcal. Gene polymorphism for the restriction enzyme TaqI digestion site (rs731236) were detected by real-time PCR using TaqMan probes. **Results:** No significant difference in the bone mass was observed between the VDR polymorphisms (TT versus TC + CC). The present study did not demonstrate any correlation between VDR polymorphism and bone mass. Similarly, no correlation was observed between nutritional intake and bone mass. Meanwhile, the results of multiple linear regression analysis ascertain that high BMI levels and the experience of high-impact exercise during junior high school or high school have an independent positive effect on bone mass. **Conclusion:** These results suggest that BMI and exercise are highly likely to be important factors in increasing bone mass.

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Stress Amelioration Potentials of Shiikuwasha (*Citrus depressa* Hayata*)* Essential Oil

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Keywords: Shiikuwasha essential oil · Aroma inhalation · Stress amelioration

Background/Aims: Shiikuwasha (*Citrus depressa* Hayata), as also known as Hirami lemon, is a native thin-skinned flat lemon cultivar of Okinawa, Japan, which contains predominant volatile components limonene and γ-terpinene, ca. 57 and 25%, respectively, that compositionally differ from other known citrus cultivars. The study aimed to investigate the contribution of Shiikuwa-

sha essential oil (SEO) on stress amelioration. **Methods:** A randomized study design was employed. The SEO and its two predominant active-odor compounds limonene and γ-terpinene were evaluated through inhalation administration in nine female adult healthy subjects (20.4 ± 0.7 years old) against a 30 min visual display terminal (VDT) test. The samples were air-streamed through squalene as carrier oil. Stress amelioration was monitored through physiological effects using profile of mood states test and band powers of electrical brain activity via electroencephalogram (EEG) over VDT work. **Results:** SEO stream with fresh, fruity and lemon-like sensations during VDT work slightly enhanced psychological total mood disturbance score by increasing vigor status and declining fatigue felling in aroma inhalation participants. Remarkable results were physiologically achieved in the EEG record when participants were administrated by γ-terpinene stream in which significantly lower relative power of beta and theta spectral bands at the midline occipital electrode location Oz was consistently observed during VDT work compared with other treatments, indicating its effect on brain active concentration and anxious thinking. **Conclusion:** SEO and its active-odor compounds, particularly γ-terpinene, possess stress amelioration potentials. Practical applications of aroma administration in nutrition and well-being study need further studies.

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Dietary Supplements Used by Patients with Irritable Bowel Syndrome to Cope with Gastrointestinal Symptoms, and Their Effects on Hopelessness Levels

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Keywords: Irritable bowel syndrome · Dietary supplements · Gastrointestınal symptoms · Hopelessness

Background/Aims: This study was conducted to determine the dietary supplements (DS) used by patients with Irritable Bowel Syndrome (IBS) to cope with gastrointestinal symptoms (GIS), and their effect on hopelessness levels. **Methods:** This cross sectional study consisted of 132 patients presenting at the polyclinic between the dates of 01.03.2017–05.05.2017, while the sample consisted of 127 patients who were 18 years of age or above, diagnosed with IBS, had no communication problems, and agreed to participate in the study. Data was collected using a patient identification form questioning socio demographic characteristics and DS use, the Gastrointestinal Symptom Rating Scale (GSRS), and the Beck Hopelessness Scale. **Results:** The frequency of DS use in the last year among IBS patients was 73.2%. Younger patients, women, those with graduate education and those with better economic status were found to prefer DS more (p = 0.000). Nausea and constipation were predictors of DS use with a rate of 40.9% (R2 = 0.409, p < 0.0001). The patients were found to use mint oil (35.6%), mint juice (24.6%), lemon (20.5%), ferulacommunis (13.7%), and apricots (5.6%) for nausea, and apricots (48.2%), dietary fibers (16.9%), senna (9.6%), probiotics (6%) and alder dogwood leaves (6%) for constipation. Patients who did not use DS were found to be more hopeless (p < 0.03). **Conclusion:** It was found that 73.2% of IBS

patients used DS to cope with GIS. Patients who did not use DS were found to be more hopeless. DS with proven effectiveness can be integrated into traditional treatments.

Poster Presentation

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The Difference of Maximum Cardiorespiratory Test on High-Intensity Interval Training (HIIT) and Aerobic

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Keywords: HIIT · Aerobic · Fitness score · Cardiorespiratory

Background/Aims: High-intensity Interval Training (HIIT) and Aerobic has been shown to be efficient in maximizing cardiorespiratory test (VO_2max). This study analyzed the maximum capacity of VO_2 on HIIT and Aerobic on female and male subjects. The objective of this study is to know the difference in maximum cardiorespiratory score on HIIT and Aerobic. **Methods:** This study used Quasi-experimental design, which included 29 subjects aged 21–26 years (BMI 22.7 ± 3.4 kg/m^2) divided into two groups: Aerobic (n = 15) and HIIT (n = 14). The intervention was done in 7 days. Cardiorespiratory Test (VO_2max) by bleep test (before and after) intervention was given to the subjects. **Results:** Compared with baseline cardiorespiratory test before (2.68 ± 0.7) and after (3.23 ± 1.7) results showed that HIIT is more efficient in maximizing Cardiorespiratory on the subjects. Therefore HIIT can be used as an option on improving Fitness Score. Seven days of intervention was done on 29 subjects, results showed that HIIT can be used as an alternative option on improving Fitness Score. **Conclusions:** Hence, it appears that in term of maximizing cardiorespiratory test (VO2max) HIIT is more effective on improving Fitness Score rather than Aerobic.

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Nutrition Knowledge and Attitudes and Practices on Food Habits by National Level Athletes

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Keywords: Food habits · Scoring · Sri Lanka

Background/Aims: Performance of athletes depends on a number of factors such as physical qualities, proper training and optimum nutrition. The knowledge, attitudes, and practices (KAPs) towards nutritional issues play a pivotal role in the maintenance of their sport performances, overall health and wellness. The objective of the study was to determine the level of nutrition KAP on food habits of national level athletes in Sri Lanka. **Meth-** **ods:** Based on the common dietary practices of athletes, a questionnaire was formulated. A set of ten questions on knowledge, eight questions on attitude and ten questions on practices were framed. A total of 180 athletes involving in different sports were included. Interviewer administered pre-tested questionnaire was used to gather information on KAPs. The levels of KAPs of food habits were presented by using standard scoring system. **Results:** KAPs survey showed that nearly a half of the respondents had good level of knowledge whereas only 61% of subjects had excellent level (≥80%) of attitudes regarding food habits. Only one-fourth of athletes demonstrated excellent level (≥80%) practices. Nearly 67% of athletes were aware of pre event meal. Further, 57% of subjects answered correctly as use of carbohydrate as primary fuel. Two third of athletes told examples for carbohydrate containing foods. Majority had knowledge about calcium metabolism. More than half of the athletes (54%) knew the fact that of mineral loss with sweat. **Conclusion:** The present study identified good level of attitudes, but there were gaps in KAPs on dietary habits among athletes.

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Fluid Intake Pattern and Hydration Status of National Level Athletes

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Keywords: Fluid recall · Sports drinks · Sri Lanka · Urine

Background/Aims: The adequate nutrition for athletes is needed to maintain energy supply to the working muscles, to support tissue adaptation, to grow and repair tissues and to promote immune functions. The aims of present study were to assess the hydration status and fluid intake pattern of national level athletes in Sri Lanka. **Methods:** The study was a cross sectional study with a total of 180 athletes involving in different sports events. Interviewer administered pre-tested questionnaire was used to get general information of participants. A pre-tested qualitative fluid frequency questionnaire and a 24-hour fluid recall were used to collect information on fluid intake. One spontaneously voided urine sample was collected from each participant and specific gravity and urine colour were measured in triplicate. Athletes engaging in badminton, boxing, weight lifting, taekwondo, karate, marathon, volleyball, netball, football and track and field were the participants in the study. **Results:** Results showed that mean total fluid and water intake of athletes were 4.1L (SD 2.0) and 3.3L (SD 1.8) per day, respectively. Athletes consumed different types of fluid before, during and after the sport event. Majority of athletes were minimally dehydrated, whereas 15.7% appeared significantly hypo-hydrated. It was revealed that 28.6% athletes were well hydrated while none of athletes was seriously dehydrated. About 18% of athletes consumed sport drinks more than three times per day. **Conclusion:** Some of athletes participated at national level events have appropriate intake of fluid daily. However, results confirmed that fluid intake pattern of athletes needs to be improved.

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Effect of Dietary Intake Behavior on Perceived Health Status among The Mature-Age Generation

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Keywords: Mature-age generation · Dietary intake behaviour · Six groups of foods · Perceived health status

Background/Aims: The World Health Organization has defined that health is a state of complete physical, mental and social well-being. Balanced diet, on the basis of Dietary Guideline of Taiwan, is the foundation of disease prevention and health maintenance. As Taiwan has been changed to the aged society in 2018, the objective of this study was to evaluate the influence of dietary intake behaviors on perceived health status among the mature-age generation by subjective feelings of themselves. **Methods:** There were 300 volunteers of fifty and above in Taoyuan, Taiwan, as subjects, were sampled by convenience sampling and were tested by closed questionnaire. Then, all the data were analyzed by chi-square test, independent samples t-test and one-way ANOVA with Scheffe's post hoc test using SPSS for windows 23.0. **Results:** The result revealed most of subjects took dairy enough but took other foods insufficiently, especially vegetables, fruits and oil. Most of over-65-year-olds took diary and fruits adequately. Most of retirees took diary enough. Besides, most of subjects living with family took grains and protein sufficiently. As the perspective of perceived health status, over-65-year-olds, retirees, or subjects living in non-industrial area showed better life adjustment and interpersonal interaction. Retirees and urbanites had better emotional state. Additionally, subjects who took adequate grains and protein expressed better emotional state and physical condition. Better life adjustment and interpersonal interaction for sufficient dairy takings. **Conclusion:** We concluded that taking adequate foods definitely strengthened various aspects of perceived health status of mature-age generation, and this can be a reference for the institutes of senior education.

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Effect of Giving *Musa Sapientum Var Paradisiaca Baker* against Blood Glucose Levels and the Level of Rhythmic Gymnastics Athlete Anxiety in the Atmosphere of Competition

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Keywords: *Musa Paradisiaca Var Sapientum Baker* · Glucose antiexy · Ritmic gymnastics

Background/Aims: This research proves the effect of giving *Musa Sapientum Var Paradisiaca Baker* against blood glucose levels and the level of anxiety of athletes. **Methods:** The subject of this research is the Rhythmic Gymnastics athletes throughout the junior and senior groups in Central Java as much as 16 athletes. The results of the treatment group were 0.181 and the control group

was 0.689, there was no influence of *Musa Paradisiaca Var Sapientum Baker* in increasing blood glucose.The treatment group before and after intervention was seen to increase compared to the control group. The giving of *Musa Paradisiaca Var Sapientum Baker* to the hormone cortisol using repeated anova test analysis with a value of 0.566 means that there is no influence of *Musa Paradisiaca Var Sapientum Baker* on the hormone cortisol. A large difference occurred in the control group compared to the treatment group. Giving *Musa Paradisiaca Var Sapientum Baker* to the pulse using a repeated anova test analysis with a value of 0.157 means that there is no influence of *Musa Paradisiaca Var Sapientum Baker* on the pulse. **Results:** There was an increase in the pulse before warming up and after heating which was higher in the control group than in the treatment group. Giving *Musa Paradisiaca Var Sapientum Baker* to the athlete's anxiety level using the chi-square test analysis. **Conclusion:** The results of the study did not influence the giving of *Musa Paradisiaca Var Sapientum Baker* to the level of anxiety with a value of 0.163, seen in the treatment group moderate anxiety level while the control group was high.

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Nutrition and Athlete Performance by Somatotype Measurement

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Keywords: Nutrition · Athlete performance · Somatotype

Background/Aims: The best performance in sport determines by several factors, one of them is a good nutrition. Nutrition plays a pivotal role in sustaining human health, extending healthy life span, enhancing sports performance, and offsetting the challenging of advancing age. As current research improves the understanding of a dietary requirements in different contexts of human function, a comprehensive appraisal of the role of nutrition in human health and performance is warranted. **Methods:** Many factors are involved in determining how much of the various essential nutrients are required by an individual to meet daily needs and support optimal sports performance. In many sports somatotype components are not homogeneous, not even in the groups that were singled out by the quality. There were significant differences within the same sport and in terms of the playing position. Somatotype is helpful in sports in which the body shape could influence the resulting performance. **Results:** Anthropometry has been shown to play an important role in athlete selection and performance criteria in sports. It is obvious that determination of the somatotype is especially supportive in sports in which the body may impact on the biomechanics of movement and the resulting performance. It is well known that the anthropometric profile may indicate whether a player would be suitable to participate at the highest level in a specific sport. **Conclusion:** Analysis of the literature has shown that there is a lack of information explaining the developmental pattern of high profile athletes in relation to different expressions of the human somatotype.

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Effect of Iron and Zinc Substance Giving through Fortification Rice on Stress Level of School Age Children in Islamic Boarding School, Annihayah Karawang

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Keywords: Fortification rice · Anemia · Multi-micronutrient deficiency · Zinc · Psychosocial stress

Background/Aims: Research aimed at analysing the effect of iron and zinc substance giving through the fortification rice medium on the students stress level. **Methods:** This was a true experimental research with the Double Blind Randomized Control Trial or DB-RCT. The population in this study were 600 boarding school students, with a sample of 160 students who proved anemia (Hb levels <11 mg/dl) **Results:** The research result indicates that the fortification rice giving has the affect on the iron deficiency anemia status by increasing the hemoglobin content (MD = 0.36 mg/dl, p = 0.000), the ferritin serum content (MD= −10.3 ± 26.44 μg/dl, p = 0.059), and zinc serum (MD = −21.78 mg/dl, p = 0.000) on the subjects decrease. The fortification rice giving decreases stress score (MD = −10.96, p = 0.000) and decreases stress level better compare with the ordinary rice. There is the correlation of the hemoglobin content escalation, the ferritin serum content and the zinc serum content with the stress score of before and after the intervention. The results of this study state that stress is more related to zinc deficiency than iron deficiency. This is because zinc deficiency in the body also causes a significant decrease in zinc concentration in the brain. **Conclusion:** These neurophysical symptoms are mainly caused by a decrease in the histochemical reaction of zinc in the brain, whereas it does not occur if only iron deficiency.

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Effects of Silk Peptides Treatment on Fat Utilization in Resting Mice

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Keywords: Silk peptides · RMR · Energy expenditure · FAT/CD36

Background/Aims: The aim of the present study was to investigate the effects of treatment with silk peptides (SP) on resting energy expenditure over a 24-h period and clarify the molecular mechanism underlying its enhancement of fat utilization in mouse skeletal muscles. **Methods:** Sixteen male ICR mice were divided into two groups and treated with distilled water and SP (CON and SP treatment groups, respectively). SP were dissolved in distilled water and administered to the SP group at 800 mg/kg while the CON group was administered distilled water orally daily for 2 weeks. **Results:** Final body weight and body weight gain showed no significant difference in the CON and SP groups. Conversely, food intake was significantly lower in the SP group than it was in the CON group. The sum of the RER (Respiratory exchange ratio) over 24-h was lower in the SP group than it was in the CON group, but the difference was not statistically significant. The protein levels of fatty acid translocase (FAT)/cluster of differentiation 36 (CD36) were approximately 12% higher in the SP group than they were in the CON group. **Conclusion:** These results suggest that treatment with SP 800 mg/kg for 2 weeks may promote fat utilization during physical activity, but not the entire day. In addition, SP treatment effectively enhanced FAT/CD36 protein level in skeletal muscle. In future investigations, it would be necessary to elucidate the effects of long-term SP intake on the resting metabolism of both animals and humans.

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Lifestyle and Its Effect on The Occurrence of Hypertension in Pre-elderly (45–59 years old) in the Work Area of Kalike Public Health Center, East Flores District, East Nusa Tenggara

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Keywords: Lifestyle · Hypertension · Smoking · Consumption · Stress · Physical activity

Background/Aims: Pre-elderly is a person reaching the age of 45–59 years old and prone to diseases associated with an aging process, such as hypertension. Hypertension could stimulate the occurrence of cardiovascular disease. Hypertension is associated with unhealthy lifestyles namely smoking habits, unhealthy food consumption patterns and lack of physical activity. This study aimed to determine the lifestyle effect on the incidence of hypertension among pre-elderly in the work area of Kalike Public Health Center (PHC). **Methods:** It was an analytical survey with a cross-sectional study design. The population was all pre-elderly people aged 45–59 years old (738 people). The sample consisted of 92 respondents. Simple logistic regression test was used to determine the effect of a lifestyle on the incidence of hypertension with a 90% confidence level. **Results:** The results indicated that the proportion of pre-elderly who had hypertension was 27.2%. Indicators of an unhealthy lifestyle included smoking behavior amounted to 14.1%, physical activity at risk by 33.7%, frequent consumption of foods high in sodium amounted to 22.8%, consumption of food high in fat of 5.4%, the consumption of foods high in potassium amounted to 14.1%, and stressed by 23.9%. The result of analysis showed that there was an influence between lifestyle and the incidence of hypertension (p = 0.032, OR = 3.206, 95% CI = 1.114–9.232). **Conclusion:** Pre-elderly developing hypertension should always control their blood pressure level and engage in healthy lifestyle behaviours.

Association between Buffet Menu Quality and Services on the Level of Customer Satisfaction in Days Hotel and Suites Jakarta Airport Cengkareng

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Keywords: Buffet menu quality · Service quality · Satisfaction level

Background/Aims: The growing food and nutrition service industry causes competition to be able to meet the needs of the community (consumers) in order to obtain satisfaction with these institutions, to carry out food operations both commercially and non-commercially. One of the actions to satisfy consumers is by providing the best products and services to consumers. A company or institution must be able to increase the value of products, services, and know the level of customer satisfaction. This study aims to determine association between Buffet Menu Quality and Service to Consumer Satisfaction Level. **Methods:** This type of research uses a cross-sectional study design with a sample of 86 respondents using accidental sampling. Bivariate analysis using the chi-square test. **Results:** As many as 82% of respondents stated that the quality of the buffet menu was in good category, and 18% of respondents said it was not good. Based on the results of the chi square statistical test, the value (p = 0.000, p 0.005). **Conclusion:** There is no association between the quality of service to customer satisfaction.

The Association of Dietary Pattern and Major Depressive Order: A Narrative Review

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Keywords: Major depressive disorder · Dietary pattern · Nutrition · Nutrients

Background/Aims: Major depressive disorder (MDD) is a seriously effective illness with a high lifetime prevalence rate. Despite the fact that plenty of drugs were developed for the managem17ent of MDD, a significant rate of patients taking antidepressants fail to recover. Rather than looking for pharmacologic therapies, this study explored the association between dietary patterns and MDD. **Methods:** Studies on the association between diet and MDD were mainly directed on nutrients such as fatty acids, and nutrients involved in homocysteine pathways such as vitamins B6, B9, and B12. Dietary patterns emphasizing seafood, vegetables, fruits, and nuts were associated with reduced risk of depression. While patterns emphasizing red and processed meats, and refined sugar were generally associated with increased risk of depression. **Results:** The potential protective effect in fruits and vegetables can be attributed to the presence of high amounts of antioxidants. While the protective effect in cruciferous vegetables, leafy vegetables, other green vegetables, and dried legumes can be attributed

from the large amounts of folate. Moreover, a high intake of fish suggests a low incidence of depression which has been attributed to its high content of long-chain ω-3 polyunsaturated fatty acids. **Conclusion:** In this study, the potential protective effect of the dietary pattern for the prevention of MDD may be derived from the cumulative and synergic consequences of several nutrients from the different sources of foods.

The Effect of Self-Evaluation of Dietary Life on Physical Conditioning Using Meal Check Slip

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Keywords: Athlete · College student · Conditioning · Dietary balance · Meal check slips

Background/Aims: In order to improve athletes' performance, desirable eating habits, developing athletic physique, and conditioning are important elements (Higuchi, 1997, 2002). Previous research revealed that a self-assessment of dietary life using "dietary balance check ticket", for university student athletes who had difficulty in self-management of dietary life, contributed to acquisition and establishment of desirable dietary habits (Kamiya et al., 2012). A change in dietary habits leads to a change in physical conditioning; however, such considerations have not been investigated well. We examined the influence of dietary self-evaluation on physical conditioning using meal check slips. The subjects were 213 students (18.33 ± 0.587 years old, 57 females) who completed the survey among university first graders belonging to the T University Sports Club Movement Division. The survey period was from April to June 2018, performed a total of 3 times using the dietary balance check slip (Omi et al., 2008) and meal check slip. Data were statistically analyzed using SPSS ver. 25.0 software in combination with the Wilcoxon's T test. The level of significance was set at 5%. **Results:** Through self-assessment by the dietary balance check and meal check slips, a significant (p < 0.001) improvement was seen in June from April. **Conclusion:** We clarified that physical conditioning is also affected by altering one's eating habits.

Body Mass Index Is Associated with Mental Health Problems in Coastal Communities of Banyuwangi, Indonesia

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Keywords: Mental health · Nutrition · Body mass index

Background/Aims: There has been a growing interest in studying nutrition in relation to mental health. Mental health condition

may affect nutritional status and, vice versa, intake of certain nutrients is linked to mental health. The study aimed to assess the association between nutritional status and mental health problem in people living in coastal areas of Banyuwangi, East Java, Indonesia. **Methods:** Data from a cross-sectional study to assess the association between food intake and mental health as well as metabolic syndrome in coastal communities in Banyuwangi, Indonesia, was used for analysis. Regression analysis was used to assess the association between Self-Reported Questionnaire (SRQ) score and short-term nutritional status (body mass index (BMI)) and longer-term nutritional status (height and waist circumference). Other covariates included education, age, ethnic group, food security score and residence. **Results:** Data from 145 respondents who had complete information on covariates were available for analysis. BMI was negatively associated with SRQ score. After adjusting for covariates every unit increase in BMI was associated with a decrease of 0.13 points of SRQ score (Coef: –0.13; 95% CI: –0.24 to –0.01, p = 0.03). Height and waist circumference, however, were not associated with SRQ score. **Conclusion:** Short-term nutritional status (BMI), not longer-term nutritional status, was associated with mental health problems in coastal communities in Banyuwangi. BMI is potentially a suitable nutritional status indicator for assessment of mental health problems in this population.

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Undergraduate Students' Lifestyle: Are They at Risk of Constipation?

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Keywords: Constipation · Energy · Dietary fiber · Total fluid intake

Background/Aims: Constipation had been reported to be one of the most common health problems among university students. Based on Rome III diagnostic criteria for constipation, the prevalence of functional constipation among university students was 16.2%. University students are known for health-related behavioral changes as they are leaving their parents and living at university hostels. Therefore, they had tendency to consume high caloric snacks, fast foods as well as lower fruits and vegetables intake. The study aimed to determine the associations between socio-demographic characteristics, dietary intake, physical activity and stress level with constipation among undergraduate students. Method: A total of 140 undergraduate students (27.9% males and 72.1% females) participated in this study. Self-administered questionnaires included socio-demographic characteristics, a 3-day dietary record, short form of International Physical Activity Questionnaire, Cohen's Perceived Stress Scale and an Agachan's Constipation Score System Questionnaire were used. **Results:** Mean daily dietary intake for energy, dietary fiber and fluid were 1,567 ± 438 kcal, 5.6 ± 3.5 g and 2301 ± 946 ml, respectively. Majority of the participants had moderate to high physical activity level and faced high score of stress. Approximately, 60% of the participants had slight constipation, and only 1.4% had severe constipation. Sex

($\chi 2$ = 5.29, p = 0.021) and ethnicity ($\chi 2$ = 14.64, p = <0.001) were significantly associated with constipation. Dietary fiber (r = –0.18, p = 0.038) and total fluid intake (r = –0.25, p = 0.003) were associated with constipation. Constipation was associated with higher stress level (r = –0.60, p = <0.001); (χ^2=25.81, p = <0.001). **Conclusion:** Sex, ethnicity, dietary fiber intake, total fluid intake and stress level were significantly associated with constipation.

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Current Recognition of Six Main Food Groups by General Public in Pingtung, Taiwan

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Keywords: Groups of food · Balanced diet · Community nutrition

Background/Aims: The 2005–2008 "Survey on Changes to the Nutritional Health of the Public" shows that daily food consumption has diverged from dietary recommendations. Many studies indicate that unhealthy diets are main contributors to non-communicable diseases. Highly refined foods are linked to chronic diseases such as obesity, cardiovascular disease, diabetes, osteoporosis, and cancer. Consequently, world-wide trends are emphasizing better dietary understandings and eating habits to improve health and control obesity. The ability to differentiate between food categories can allow for more balanced diets. The study aimed to test the public's understanding of different food groups **Methods:** Between May and September, 2018, games were used at community activities as test model. Common foods were divided into three groups, each including seven items representing the six main food groups (e.g. Group 2: pumpkin, tofu, Bok Choy, red dates, peanuts, yogurt, beefsteak tomato). Results were subjected to student t tests and Pearson Correlation analysis. **Results:** Data was collected from 129 individuals; 75 females, 54 males. The average age was 49.2 ± 17.1 years. The overall rate of correct answers was 55.5%±19.3. Correct answers on grains and oils (include nuts) were below the average. Often, grains were miscategorized as vegetables and nuts as grains. The female group's recognition of categories was superior to the male's. Grouped by age, those 25 years and under scored highest and those between 46–65 years scored lowest. **Conclusion:** When promoting community nutrition, more information on grains and oils (include nuts) could help the public understand balanced diets and help stave of chronic diseases.

The Effect of Dietary Supplement Use on Quality of Life and Depression in Patients with Chronic Liver Disease

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Keywords: Chronic liver disease · Dietary supplement · Quality of life · Depression

Background/Aims: The aim of this study was to determine the effect of dietary supplement (DS) use on QoL and depression in patients with chronic liver disease (CLD). **Methods:** This cross-sectional study consisted of 330 patients presenting at the polyclinic between the dates of 01.04 –15.05.2018, while the sample consisted of 256 patients who were 18 years of age or above, diagnosed with CLD, had no communication problems, and agreed to participate in the study. Data was collected using a patient identification form questioning socio demographic characteristics and DS use, the "Chronic Liver Disease Quality of Life Inventory 2.0" (LDSI 2.0), and the Beck Depression Inventory. **Results:** The frequency of DS used in the last year among CLD patients was 48.4%. In patients using DS, the LDSI 2.0 total score was found to be significantly lower compared to those who did not ($p = 0.04$). Patients with better economic status ($p = 0.02$), patients who did not drink alcohol ($p = 0.01$), patients with no additional chronic disease ($p = 0.001$), and patients with a disease duration of 6 to 10 years ($p = 0.02$) were found to prefer DS more. No statistically significant difference could be found between the BDI scores of patients who did and did not use DS ($p > 0.05$). **Conclusion:** Almost half of the individuals with CLD used DS. Those who did not use DS had lower QoL. In order to prevent insensible consumption and hepatotoxicity, DS with proven efficiency can be integrated into traditional treatments.

Track 4: Nutrition and Food Innovation

Oral Presentation

Morphological, Rheological and Tribological Properties of *Lactobacillus rhamnosus GG* (*LGG*) Encapsulated Protein-Alginate Composite Microgels

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Keywords: *LGG* · Alginate · MPC · Rheology · Tribology

Background/Aims: *Lactobacillus rhamnosus GG* (*LGG*) is the most widely studied probiotic strain due to its beneficial effects for human life. However, many reports indicated that the viability of probiotics might decrease severely due to heat. Therefore, certain methods should be employed to protect the probiotic cells. This study aimed to investigate the impact of addition of chymosin-treated protein material on the morphology as well as textural and tribological properties of encapsulated *LGG* alginate microgels. **Methods:** Sodium alginate and milk protein concentrate (MPC) were used as matrix materials for encapsulation of *LGG*. Four formulations of protein-alginate microgels were produced using a patented dual aerosol method. One formulation of alginate microgels (1% alginate) was compared to three formulations of composite microgels (1% MPC-1% alginate, 1% MPC-1.5% alginate, and 1% MPC-2% alginate). Sandpaper, canola oil, and water were employed to assist rheological and tribological measurements, respectively. **Results:** All microgels had high sphericity and composite microgels were larger than alginate microgels. Particle size of the microgels ranged from 30–200 μm. A typical shear-thinning and solid-like behaviour were observed in all formulations. Standard tribological assessment method, using gels with and without lubricants, showed only low- and medium-speed regime with no statistically significant difference in frictional behaviour between alginate and protein-alginate composite microgels. **Conclusions:** Increase in the protein concentration of the composite formulation by addition of chymosin-treated protein material decreased the moisture content of the microgels and resulted in a compact matrix able to avoid absorption of excess water.

Harvest Control Rule as a Strategy to Minimize Fish Quality Losses

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Keywords: Fish quality loss · Harvest control rule · Harvest strategy · Season variation

Background/Aims: Harvest Control Rules refers to fisheries management measures designed to operationalize a management framework called Harvest Strategy. Rules and strategy aim at certain management objectives, including maintaining fish quality. This paper presents results of a study on season-related fish catch quality, and shows how this links to harvest control rules. The results include how real seasonal quality variation occurs, the impact thereof, and the difficulty in dealing with these impacts. **Method:** The study was conducted in 2016 at a number of fish landing sites with a case study approach. Interviews were carried out with fishermen, fresh-fish traders, processors, processed-fish traders, and consumers, each represented by 10 respondents/location. **Result:** This study confirms that seasonal variation causes large portions of fish damaged and become unavailable for supply of nutritious food. Market responds to this with options available; however, responses are constrained by a number of factors. Recognizing this,

it seems that the problem can be handled more properly through accommodation in the harvest control rule scheme. Referring to this scheme, the insertion of the aspect of quality loss must get emphasis mainly on two things: formulation of management goal and determination of the harvest control rule. The goal can be described as 'formulating harvesting strategies that bring the minimum quality loss'. Meanwhile, harvest control rules aim at imposing harvest levels within the range that is sufficient to sustain stocks, avoid fish deterioration in the peak season, and allow for manageable peak season oversupply to be stored in preparation for the low season.

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Chemical Composition and Radical Scavenging Activity of Indonesian Stingless Bee Propolis

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Keywords: Antioxidant activity – Chemical composition – Propolis – Stingless bee
Background/Aims: Propolis is one of bee product that has many health benefits. The exploration of stingless bee propolis is still limited. This study was aimed to investigate the diversity of the chemical composition and radical scavenging activity of Indonesian stingless bee propolis from three provinces of Indonesia. **Method:** Stingless bee propolis from Banten (Tetragonula laevicep), South Kalimantan (Heterotrigona itama), and South Sulawesi (Tetragonula biroi) were prepared using ultrasound-assisted extraction. We used gas chromatography mass spectra (GC-MS) to profile chemical composition as the initial identification. Furthermore, vacuum liquid chromatography (VLC), silica gel column, sephadex column, and preparative thin layer chromatography (PTLC) were performed to isolate some constituents. **Result:** This study successfully identified mangifera indica propolis type with typical composition, cycloartenol, anacardic acid, cardols, cardanols, magiferolic acid, and ambolic acid in propolis from Banten and South Kalimantan. However, we found some papuanic acids in propolis from South Sulawesi. These constituents are commonly found from the barck resin of Calophylum papuanum. The result also showed Indonesian stingless bee propolis demonstrated various antioxidant activity with IC50 ranging from 452.52 up to 1027.29 mg/L. This study might support that the availability of resin sources affect chemical composition and leading to various activity.

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Effect of Heating/Frying on Trans Fatty Acid Content and Oxidative Stability of Groundnut Oil

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Keywords: Trans fatty acid · Oxidative stability · Frying
Background/Aims: Heating/frying at elevated temperatures cause numerous physico-chemical reactions including oxidative deterioration and trans fatty acids (TFA) formation. The study aimed at assessing the effect of constant heating/frying on formation of TFA and oxidative stability in groundnut oil. **Methods:** Freshly-cut potato strips were fried constantly at varying temperatures for one hour at certain temperatures (160, 180, 200, 220, and 230 ºC). Analysis of TFA was performed using gas chromatography, while other chemical parameters were assessed following the official methods of AOCS. **Results:** Oil samples subjected to heating/frying at various temperatures demonstrated a significant increase in TFA ($p < 0.05$) and saturated fatty acids ($p < 0.05$), while there was a corresponding decrease in cis-unsaturated fatty acids ($p < 0.05$). Frying process at 160 and 230 ºC demonstrated greater formation of TFA with 0.11 ± 0.01 and 2.33 ± 0.05 g/100 g, respectively, as compared to heating alone at similar temperatures (0.07 g ± 0.01 and 0.47 ± 0.02 g/100 g), indicating that a significant difference in the generation of TFA during the two thermal treatments ($p = 0.05$). With increasing temperatures, acid value, p-anisidine value and total oxidation value also showed a significant increase ($p < 0.01$); however, peroxide value was found to be inconsistent. **Conclusions:** For groundnut oil, TFA formation and oxidative indices (except for peroxide value) are directly influenced by the temperature of heating/frying. Since formation of TFA and poor oxidative stability can pose serious health concerns, food safety agencies need to formulate appropriate policies and food laws and impose necessary safety regulations to avoid oil abuse during the process of heating and frying of foodproduct.

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Relationship between Energy Expenditure, Menstrual Condition, and Bone Mineral Density in Female Athlete Triad

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Keywords: Energy state · Resting metabolic rate · Body composition · Runner
Background/Aims: Female Athlete Triad (FAT), which consists of low energy availability (EA), amenorrhea, and osteoporosis, is regarded as a health problem among female athletes. Evaluation of EA is the typical method used to evaluate the health of athletes. However, current evaluation method usually has low ac-

curacy. In order to prevent FAT at an early stage, it is important to establish a new method to assess the energy state. Thus, this study aimed to clarify the influence of energy state on bone using EA and the ratio of measured. **Methods:** Resting Metabolic Rate (mRMR) to predict Resting Metabolic Rate (pRMR). Human Calorimeter was used to determine mRMR, while pRMR was calculated using body composition measured by DXA. Calculation of EA was collected from the Mets and daily energy intake. In addition, deoxypyridinoline was also determined as a bone resorption marker. **Results:** The rate of mRMR/pRMR was not significantly different in athletes group. In contrast to the positive correlation between EA and deoxypyridinoline (r = 0.453, p = 0.068), the value of mRMR/pRMR and deoxypyridinoline showed a possibility of negative correlation (r = –0.196, p = 0.395). **Conclusions:** The use of mRMR/pRMR can accurately reflect the deoxypyridinoline level, thus it could be used as an alternative method to evaluate energy state instead of EA.

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Developmental and Maternal Toxicity of Indonesian Stingless Bee Propolis

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Keywords: Ethanol extract · Pregnancy · Stingless bee propolis · Water extract

Background/Aims: Propolis is a natural product that has many health benefits. Its antibacterial, antiviral, antifungal, anti-inflammatory, and antioxidant properties have made it as one of an important composition in food development. This study aimed to examine the effect of propolis administration on pregnancy. **Methods:** Pregnant mice were used (n = 25) and divided into five groups: control (1% Tween 80), low (380 mg/kg) and high (1400 mg/kg) doses of ethanol extract of propolis (EEP), and low (380 mg/kg) and high (1400 mg/kg) doses of water extract of propolis (WEP). The propolis extracts were administered from day 0 to day 18 of gestational period. The animals were fed with standard diet and maintained in a laboratory environment. Maternal serum, kidney, and liver were analyzed to examine maternal toxicity, while morphological, visceral, and skeletal examination of fetuses were conducted to analyze developmental toxicity. **Results:** There were no significant differences found among groups in terms of maternal weight gain, liver and kidney weight, serum urea, creatinine, alanine aminotransferase (ALT), and aspartate aminotransferase (AST) (p > 0.05). High dose of EEP significantly reduced weight and crown-rump of fetuses, increased the amount of fetal resorption, and delayed skeletal ossification of fetuses. Meanwhile, low dose of EEP and low and high doses of WEP did not affect those parameters. Placental weight, litter size, number of dead fetuses, loss of pre- and post-implantations were not significantly different among groups. **Conclusions:** WEP was deemed to be safer to use during pregnancy than EEP.

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Development of Roll Cake from Rice Bran Flour Combined with Taro Flour or Breadfruit Flour for Elderly

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Keywords: Elderly · Fiber · Roll cake

Background/Aims: Development of food for the elderly must consider not only its nutritional content but also its consistency, taking into account the physiological change in their body. Many elderly suffer from malnutrition due to inadequate and improper food intake. Among the elderly in Indonesia, 3.4% of them were malnourished, 28.3% underweight, and 24% suffering from tooth loss. Moreover, the prevalence of constipation is 3.8% among the elderly aged 60–69 years old and 6.3% for those older than 70 years old. One of the required nutrients for elderly is fiber. Thus, this study aimed to develop roll cake from combination of rice bran flour and taro or breadfruit flour as a high fiber food for malnourished elderly. **Methods:** The experiment used completely randomized design and it was conducted from July to December 2018. The treatments were: control (ricebran flour and wheat flour = 50%:50%), F2 (ricebran flour and taro flour = 40%:60%), and F3 (ricebran flour and breadfruit flour = 25%:75%. **Results:** The treatment F3 had the highest score for hedonic test, the highest amount of dietary fiber (20.7%), and the lowest fat content (22.2%). For a single serving size of 100 gram, F3 could contribute 19.5% energy, 10.5% protein, 41.9% fat, 11.2% carbohydrate, and 76.7% dietary fiber from the recommended dietary allowance (RDA) for people aged 65–80 years old. Among 30 elderly panelists, 96.7% of them liked the taste of the sample, while 90% of them preferred its texture. **Conclusions:** With its remarkable nutritional characteristics, affordable production cost, and good sensory acceptance among the elderly, this roll cake could be an alternative healthy product.

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The Influence of Cooking Method on Nutrient Content and Sensory Quality of Different Types of Rice

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Keywords: Rice · Nutrient content · Sensory quality · Cooking method

Background/Aims: Rice is the staple food in several countries. The aim of this study was to analyze the effect of different cooking methods on the nutrient content and sensory quality of various types of rice. **Methods:** The experiment used a factorial design with two factors i.e. types of rice (black, red, and white rice) and cooking techniques (with rice cooker, with pressure cooker, and by conventional steaming). Sensory evaluation using hedonic test

with 30 untrained panelists was performed and the nutrient content of the samples was analyzed. Statistical analysis was performed using ANOVA and Duncan's Multiple Range Test. **Results:** White rice contained higher carbohydrate (82–83%) and starch (74–75%) compared to red rice and black rice. All colored rice contained higher protein (6.7–7.8%), fiber (8.1–8.4%), and vitamin B1 (0.31–0.37%) than white rice. The highest carbohydrate content was found in white and red rice cooked using rice cooker. While the highest protein, fiber, and vitamin B1 was found in black rice that was cooked using pressure cooker. Cooking method significantly influenced sensory quality and acceptability (color, flavor, taste, and texture) of white rice. Significant difference in terms of texture was only found in black and red rice. **Conclusions:** Dark colored rice varieties had lower carbohydrate and starch and higher content of protein, fiber, and vitamin B1 as compared to white rice. Meanwhile, nutrient content and sensory quality of rice were influenced by the cooking method.

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Functional Enhancement of Rice Bran through Fermentation and It's Sensory Evaluation

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Keywords: Antioxidant · Fermented rice bran · Rice bran · Sensory evaluation

Background/Aims: Rice Bran (RB) is rice by-product of the rice milling process of brown rice into polished rice. RB contains phytochemicals that are beneficial to human health. The aim of this study was to investigate the optimized fermentation process of RB from two varieties (Sintanur and Inpari 24) and to analyze the acceptance of fermented RB. **Methods:** The samples of RB were fermented using *Rhizopus oligosporus* and *R. oryzae* and its combination for 48, 72, and 96 h respectively. The total phenolic content (TPC) was determined using Folin-Ciocalteu method and antioxidant activity was analyzed by measuring the 2,2-diphenyl-1-picrylhydrazyl free radical scavenging activity (RSA). Non-fermented (control) or fermented RB mixed with commercial cereal and milk (in a proportion of 1 g: 2 gram: 15 mL) were analyzed by projective mapping (Napping) with 75 untrained panelists to evaluate color, taste, flavor and texture. Multiple Factor Analysis was used to obtain the sample position configuration. **Results:** Antioxidant activity and TPC of fermented RB from Inpari 24 variety were higher than those of Sintanur variety. The sample of RB Inpari 24 fermented with *R. oligosporus* for 48 h showed the highest TPC and RSA. Furthermore, there was a positive correlation showed between TPC and antioxidant activity in Sintanur and Inpari 24. Sensory analysis showed panelists were able to differentiate the characteristics (color, taste, flavor and texture) of each fermented RB sample as compared to the control.

Conclusions: Fermentation process can increase biological activities of RB as well as enhancing the sensory acceptance of the fermented RB.

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Combinations of Green Tea, Green Coffee, and Cinnamon for Development of Herbal Beverage for Hypercholesterolemia

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Keywords: Green coffee · Green tea · Herbal beverage · Hypercholesterolaemia

Background/Aims: Green tea, green coffee, and cinnamon are ingredients that have high antioxidant and they are hypothesized to have positive effect on blood lipid profile. The purpose of this study was to develop herbal beverage for people with hypercholesterolemia subject. **Methods:** This study used an organoleptic test with semi-trained panelist. Three formulas of the herbal beverage were developed with different ratios of green tea, green coffee, and cinnamon: F1 (2.5:1:1), F2 (2:1.5:1), and F3 (1.5:2:1). Data collected were analyzed with Kruskal-Wallis H test. **Results:** The average preference of color, flavor, taste, viscosity and after taste characteristics among the three formulas were not significantly different (p > 0.05). The most preferred beverage formula was F2, having the highest acceptance for overall characteristics. Each serving size (100 mL) of F2 contains 1 g carbohydrate, 3.7 g protein, 0.7 g fat, and 304 mg AEAC/100 g antioxidant. **Conclusions:** Development of herbal beverage from green tea, green coffee, and cinnamon have the potential to be consumed as an alternative high-antioxidant beverage for people with hypercholesterolemia.

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Effective Role of Teachers in Disseminating Knowledge on Balanced Nutrition and 'My Plate' Messages to Preschool Children in Indonesia

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Keywords: Balanced nutrition · My Plate · Subang · Hygiene practices · Teacher training

Background/Aims: Preschool children, about 15% of the Indonesian population, are the target for Early Childhood Nutrition program. Improvement of nutrition status, academic achievement, adulthood productivity, and prevention of chronic diseases can be achieved by investing in this age group. In order to achieve it, training of preschool teachers is important to improve the knowledge of the teachers and to equip them so that they could disseminate the knowledge to their students. This study aimed to assess the effectiveness of teacher training on healthy diet and hy-

giene practices among preschool children. **Methods:** Training of teachers with the knowledge on Balanced Nutrition and 'My Plate' program was piloted at 10 preschools in Subang district, West Java, in February 2018. **Results:** Knowledge of the teachers increased from an average of 69 to 82 (from total 100) from pre- and post-test. Several good hygiene practices were adopted such as hand washing with soap after playing and before eating and monthly growth monitoring. Moreover, mothers became more aware of the portion of vegetables and fruits that should be provided in a child's meal and the need for preschoolers to drink at least six glasses of water daily. Ten months after the training, teaching aids such as flip charts, puzzles, story books, and finger puppets were still used by the teachers in all preschools. Food, nutrition and hygiene information were also continued to be taught weekly as they could be easily integrated into the school curriculum. Hand washing with soap were still practiced every day and weight monitoring was continued to be conducted monthly. **Conclusions:** Training of preschool teachers on nutrition and hygiene practices could be accelerated using Train of Trainers and Cascade Training schemes for effective dissemination of the knowledge to the children.

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Development of Black *Oncom* Biscuit as Supplementary Food for Underweight Children

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Keywords: Biscuit · Black *oncom* · Children · Underweight
Background/Aims: There is a high prevalence of underweight among children in Indonesia. Black *oncom* is a local food from West Hava that is highly nutritious and has the potential to be utilized as an ingredient in development of biscuit as supplementary food for underweight children. The aim of the research was to develop black *oncom* as an ingredient in biscuit formulation and to assess its nutrient profile and safety. **Methods:** The experiment was conducted as a completely randomized factorial design, with three levels of black *oncom* (30, 50, 70%) and two levels of corn starch (0 and 10%) used in the formulation. The samples produced were analyzed with hedonic and ranking tests. **Results:** The biscuit sample with 50% black *oncom* and without addition of corn starch was assessed to be the most preferred sample. Each serving size of the biscuit (36 g) contributed to the Recommended Dietary Allowance for children as much as 10.87% energy, 15.08% protein, 10.74% fat, 10.58% carbohydrate, 5.68% fiber, 90.67% Fe, and 32.4% Zn. These biscuit samples were found to have aflatoxin level below the tolerance limit of B1<3.86 ppb, with the total aflatoxin level of <9.94 ppb. **Conclusions:** Black *oncom* biscuits have the potential to help improving the nutrition status of underweight children.

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Nutritional Value, Antioxidant Activity, Sensory Properties, and Glycemic Index of Cookies with the Addition of Cassava (*Manihot utilissima*) Leaf Flour

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Keywords: Cassava leaf · Cookies · Nutritional value · Antioxidant · Glycemic index
Background/Aims: Cassava leaves contain albumin, fat, carbohydrate, vitamin A, vitamin B1, and fiber, thus having the potential to be used as an ingredient in production of cookies. The purpose of this research was to determine the optimum ratios between wheat flour, cassava puree, and cassava leaves flour to produce cookies with good nutrition profile. **Methods:** This study was conducted as a Completely Randomized Design with five treatments, namely the ratios between wheat flour: cassava puree: cassava leaf flour (50:50:0), (49:49:2), (48:48:45), (47:47:6), and (46:46:8). Each treatment was replicated thrice. Parameters observed were the nutrient content, sensory acceptance, antioxidant activity, and glycemic index (GI) of the cookies. The data obtained were analyzed with ANOVA; if the test had a significant effect on the treatment, it was then continued with the Least Significant Difference test with at $\alpha = 0.05$. **Results:** The samples had moisture content ranged between 1.46 and 5.12%, with 0.23–10.10% ash, 10.67–20.76% fat, 1.20–4.26% fiber, 8.36–10.94% protein, 64.75–74.09% carbohydrates, and 426.31–480.30 kcal energy. Antioxidant activity (IC50) of the cookies ranged between 151 and 200 ppm. The most accepted sample was the one with the ratio of 49 g wheat flour: 49 g cassava puree: 2 g cassava leaf flour, with GI value as high as 77.4. **Conclusions:** Cassava leaf flour has potential to be used as an alternative ingredient in production of cookies with improved nutrition profile.

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Effectiveness of Intervention Program with Modified Instant Liquid Food based on Catfish (*Clarias gariepinus*) Flour and Nutrition Education for Stunted Children

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Keywords: *Clarias gariepinus* · Nutrition education · Stunting · Under-five
Background/Aims: Children under five vulnerable to the risk of stunting. Supplementary feeding is one of the strategies to over-

come stunting in children under five. However, increasing the nutritional status of children would be more effective if it combines food-based intervention program and nutrition education for mothers. This study aimed to analyze the effectiveness of intervention program using modified instant liquid food based on catfish (*Clarias gariepinus*) flour and nutrition education in improving albumin levels and nutritional status of stunted children. **Methods:** The experiment was conducted with pretest-posttest design using two groups (control and intervention). The intervention group was provided with modified instant liquid food for 90 days. Furthermore, mothers of the children who showed increased weight and/or albumin level during the study period were given education program on balanced nutrition guidelines accompanied by training in production of high-protein food products using catfish flour. **Results:** The intervention program with modified instant liquid food to undernourished children significantly increased their albumin and total protein levels as compared to the control group (p < 0.05). Moreover, the program also helped to improve the nutritional status of under-five children based on their WAZ score as compared to the control group. Furthermore, nutrition education provided for the mothers brought a significantly positive effect (p < 0.05) in increasing the mother's knowledge and attitude regarding food-parenting and health care, while nutritional practice score was not significantly different although it tended to increase by 8.2 ± 17.3 point. Weight gain data collected after the intervention and one month after nutrition education was 226 ± 200 g and 284 ± 300 g, respectively. **Conclusions:** Provision of modified instant liquid food made from catfish flour and nutrition education for mothers were relatively effective in improving the nutrition status stunted children under five years old.

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Development of Functional Drink from Local Fruits: Gac Fruit (*Momordica cochinchinensis* Spreng), Tomato, and Pattawiya Pineapple

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Keywords: Antioxidant capacity · Carotenoid · Functional drink · Gac · Polyphenol
Background/Aims: Gac fruit (*Momordica cochinchinensis* Spreng), tomato, and pineapple are local fruits from South East Asia local fruits that contain high bioactive compounds, such as carotenoids, phenolic, and vitamins. The objective of this research was to develop acceptable functional drink from gac fruit mixed with pineapple and tomato juice with good bioactive compound profile and sensory acceptance. **Methods:** Formulation of the functional drink was set using Design-Expert®7.00 software (D-Optimal Mixture Design) using a mixture of 47% gac juice, 45% of tomato juice (TJ) and pineapple juice (PJ), and 8% fructose syrup, which resulted in eleven formulas. The experimental factors were %TJ and %PJ used in the formulation, while the responses analyzed were total polyphenol content (TPC), DPPH, FRAP and total carotenoid content. **Results:** Different concentrations of tomato and pineapple juice incorporated in the functional drink significantly affected all responses (p < 0.05). Formula with the highest concentration of pineapple juice showed the highest content of TPC (396.91 ± 10.12 μg GAE/mL), FRAP (330.23 ± 16.21 μmol AAE/100 ml), and DPPH (277.70 ± 11.30 μM Trolox). Formula with the highest concentration of tomato juice gave the highest value of total content (3748.65 ± 20.94 μg/100 mL). However, antioxidant capacity (DPPH and FRAP) of the samples was affected more by polyphenols as the bioactive compound rather than carotenoids. Optimization of the formula by transforming exponential equation based on output responses and importance generated three formulas with the highest desirability values for proximate analysis and sensory evaluation (9-scale hedonic test). **Conclusions:** The selected formula (47% gac juice, 39.33% pineapple juice, 8% fructose, 5.67% tomato juice), which was high in bioactive compound and well-accepted by consumers, was suitable to be developed as functional drink.

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Potential Microbiota Modulation from Breastmilk Probiotics and Agricultural Waste Prebiotics

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Keywords: Antibiotics · Probiotics · Prebiotics · Breastmilk
Background/Aims: The nature and role of human milk microbiota in the early colonization and protection of infants from infection is the subject of many current researches. This study investigated the occurrence of potential probiotics in breastmilk. **Methods:** Potential probiotics in breastmilk were screened from 41 lactic acid bacteria (LAB) found in the milk. The LABs were tested for their survival abilities in the simulated gastrointestinal conditions. **Results:** Among 41 LAB, five strains showed higher antimicrobial activity and they were selected for further characterization. The five strains showed high probiotic ability. They also showed 70–80% co-aggregation ability against *E. coli* 0157:H7, *L. monocytogenes* ATCC 15313, *B. cereus* ATCC 14576, *S. aureus* ATCC 19095. In addition, the selected probiotic strains were analyzed for their growth enhancement ability (prebiotic potential) using Fructooligosaccharides (FOS) and inulin extracted from from banana peel and garlic peel. The experiment with FOS and inulin resulted in 72% and 80% growth, respectively. The presence of β-glycosidic linkages in FOS and inulin was identified by HPLC-ELSD, FTIR, and NMR studies. The cell-free supernatant of Lactobacillus and Pediococcus strains showed stronger antibacterial activities. **Conclusions:** Selected five lactic acid bacteria from breastmilk and agricultural waste such as banana and garlic peels are promising alternatives for probiotics and prebiotics to form symbiotic mechanism in gut microbiota modulation. In the future, this information would be useful in developing infant feeding formula.

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Body Type, Nutrient Intake, and Cardiorespiratory Function in Student Soccer Players

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Keywords: Somatotype · Nutrient intake · VO2max · Soccer
Background/Aims: Proper dietary management supported by intensive exercise program can optimize body type formation, especially muscular body type, and cardiorespiratory function. This study aims to identify body type, food intake, and cardiorespiratory function of student soccer players in Yogyakarta. **Methods:** The subjects consisted of 32 players (20 players from Yogyakarta State University and 12 players from Gadjah Mada University) who contributed to this study. Body type, known as somatotype, was determined by using anthropometric measurement (height, weight, subcutaneous fat thickness, arm and calf circumference, epicondylar humerus, and femur width). Food intake was measured by the 24 h food recall. The cardiorespiratory function, described by VO2max, was measured by the yo-yo intermittent recovery test level 2. The study was conducted in April – June 2014. Data were analyzed descriptively using statistical software. **Results:** More than 80% of the subjects had normal nutritional status (Body Mass Index = 21.54 ± 1.84). The average body type of players was balanced mesomorph (2.6–4.4–2.7). Subjects with balanced mesomorph and ectomorphic mesomorph had adequate energy and protein intake (energy = 2,623.83 ± 590.27 kcal and protein = 75.82 ± 16.24 g for balanced mesomorph players; energy = 2,724.68 ± 578.94 kcal and protein = 84.83 ± 29.59 g for ectomorphic mesomorph players). Players with ectomorphic mesomorph body type owned the highest VO2max level (52.37 ± 2.61 ml/kg/min). **Conclusion:** Student soccer players with mesomorph body type who are supported by adequate energy and protein intake had the most optimum VO2max level.

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Formulation of Instant Surabi from Composite Rice-Soybean Flours and Supplemented with *Torbangun* Powder as an Alternative Snack for ADHD Children

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Keywords: ADHD · Soybean · Surabi · *Torbangun*
Background/Aims: Attention Deficit Hyperactivity Disorder (ADHD) is one of the most prevalent neurobehavioral disorders among children where they experience low protein intake and micronutrient deficiencies, such as iron and calcium. However, a special diet as an alternative medication has not been evaluated yet. This study aimed to develop an instant traditional pancake (surabi) based on composite flours from rice flour and soybean flour that was supplemented with *Torbangun* powder as an alternative snack for ADHD children. **Methods:** This study used completely randomized factorial design with two factors: ratio between rice flour and soybean flour (75:25; 70:30; 65:35) and the addition of *Torbangun* powder (3%; 5%; 7%). Samples produced were then tested for hedonic test. **Results:** Panelists' preference was significantly different (p < 0.05) for color, odor and flavor of the samples. Based on results of hedonic test and physicochemical characteristics, the suggested formulation was the one with 65:35 ratio between rice flour and soybean flour and 5% addition of *Torbangun* powder. Per 100 g wet basis, the selected sample contained 62.68 g moisture, 1.30 g ash, 6.81 g protein, 0.75 g fat, 28.47 g carbohydrate, 88.62 mg calcium, 4.14 mg iron, and 144 kcal energy. **Conclusions:** Development of instant surabi from composite flours from rice flour and soybean flour with addition of *Torbangun* powder could be an alternative snack for ADHD children.

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Nutrition Counseling with and without Modules towards Nutrition Knowledge, Attitude, and Macronutrient Intake among Prediabetic Women

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Keywords: Prediabetes · Knowledge · Counseling · Module
Background/Aims: Prediabetic is one of the risk factors for degenerative diseases. A method to prevent it is by improving the knowledge and attitude through counseling. The purpose of the study was to analyze the difference between the effect of nutrition counseling with and without module towards nutrition knowledge, attitude, and adequacy of macronutrients (energy, protein, fats, and carbohydrates) intake among prediabetic women. **Methods:** This study was a quasi-experimental with pretest-posttest control group design. The subjects consisted of 29 women aged 35–50 with prediabetic. They were divided into 2 groups: a treatment group that was provided with modules (n = 15) and a control group with no modules (n = 14). The counseling was assessed 4 times, each for 15–30 min. Paired t-test and Wilcoxon signed-ranked test were used for within group comparison, while independent t-test and Mann-Whitney U test were used for between groups comparison. **Results:** In the treatment group, there was a significant increase of score from pre-test to post-test in terms of knowledge (p = 0.01) by 16.16 ± 21.56 and attitude (p = 0.04) by 1.46 ± 2.66. Similarly, the increase in control group for knowledge (p = 0.02) was 10.71 ± 15.39. There was no significant difference between control group and treatment group in terms of improvement of knowledge (p = 0.443), attitude (p = 0.783), energy intake (p = 0.693), carbohydrates (p = 0.585), protein (p = 0.458), and fat (p = 0.495). **Conclusions:** Counseling using module for prediabetic women resulted in higher increase of knowledge as compared to without module.

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Comparison of Microencapsulation Methods of *Lactobacillus acidophillus* during Heat Processing

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Keywords: *Lactobacillus acidophilus* · Microencapsulation · Alginate-starch · Heat processing

Background/Aims: Probiotics have many health benefits and they can be potentially added to food products. Other than being applied in fermented foods, probiotic can also be applied in non-fermented foods by using a coating material that can protect them from extreme environmental conditions. To increase the resistance of probiotics, the microencapsulation method could use alginate and complex of alginate-corn starch. This research aimed to compare the stability of *Lactobacillus acidophilus* microencapsulation method using two types of coating during heat processing. **Methods:** Survival of free and encapsulated probiotic cells was determined by heating *L. acidophilus* ATCC 314 at 50, 70, and 80 °C. Statistical analysis was carried out using ANOVA. **Results:** The average size of the capsules coated with alginate was 12–18 μm, whereas those coated with alginate-starch had the size of 9–16 μm. Enumeration of free probiotic cells showed 9.97 ± 0.09 log CFU/mL, while in alginate encapsulation treatment, there was 7.67 ± 0.15 log CFU/mL, and in alginate-starch encapsulation methods, the value was 8.39 ± 0.03 log CFU/mL. Reduction of number of total cells after heating showed that the largest reduction was for free probiotic cells followed by alginate-starch encapsulation and alginate encapsulation at 50 and 70°C. At 80°C, the reduction was similar among treatments since all probiotic cells had already died. The number of injured and healthy cells showed no significant differences among the three samples at 50 °C, but there was a significant difference found at 70°C. All free probiotic cells died at 70°C, whereas in alginate and alginate-starch encapsulated samples, there were still healthy cells at an average value of 6 and 5 Log CFU/mL. **Conclusions:** Microencapsulation of probiotics with alginate beads and addition of starch was more suitable than similar technique without starch, thus it could be used to enrich food with probiotics.

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Potential Alternative Source of Plant Protein from Oil Palm Biomass

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Keywords: Protein hydrolysate · Enzymatic extraction · Oil palm leaves · Microbiological enzymes

Background/Aims: Palm mills in Malaysia produce 90% of waste from a total production of approximately 20 million tons per year, resulting in crucial waste disposal and environmental problem. Thus, transforming this biomass into functional product is vital to overcome environmental issues. This study aimed to hydrolyze the protein from oil palm leaves and determine its physicochemical properties. The protein hydrolysate collected was expected to have the potential as a natural inhibitor, since there is an increased need for it as an alternative to synthetic drug due to side effects of the drugs, such as skin rash. **Methods:** The effects of Alcalase, Pepsin, and Flavourzyme on protein extraction were examined with hydrolysis time varied from 2–6 h and enzyme concentration ranged from 0–10%. Data were collected in triplicate and statistical analysis (ANOVA) was conducted. **Results:** Protein content after hydrolysis for 2–6 ho with 0–10% (w/v) of Alcalase was in the range of 8–12%, with the protein having a molecular weight of 30 kDa. Total phenolic content (TPC) and total flavonoid content (TFC) of the hydrolysate were in the range of 9–13 mg of gallic acid equivalent (GAE) and 3–6 mg of rutin equivalent (RE), respectively, for 1 g of hydrolysate. **Conclusions:** Protein hydrolysate extracted from oil palm leaves has great potential as an alternative source of protein with bio-active functions, which can be used as a natural inhibitor.

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Effect of Different Processing Methods on Physicochemical Properties and Protein Quality of Small Shrimp (*Acetes indicus*) Flour

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Keywords: *Acetes indicus* · Amino acid · Protein quality · Shrimp flour

Background/Aims: Shrimp contains high protein that is needed for human growth. This study aimed to determine the effect of different processing methods on physicochemical properties and protein quality of small shrimp (*Acetes indicus*) flour (SSF). **Methods:** Two different processing methods were used to produce SSF: blending process before (SSF-A) and after (SSF-B) oven drying. Selection of the optimal processing method was determined by moisture content, protein content, and protein quality (chemical score, amino acid score, essential amino acid index, predicted protein efficiency , and biological value) of the samples. Amino acid composition was analyzed using Ultra Performance Liquid Chromatography (UPLC). **Results:** Physicochemical properties and protein quality of SSF were significantly different (p < 0.05) between the two samples. The moisture content of SSF-B was significantly lower than SSF-A (p < 0.05). Moreover, protein content and protein quality of SSF-B were better than SSF-A (p < 0.05). **Conclusions:** Different processing methods influenced physicochemical properties and protein quality of SSF.

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Survival of the Probiotic *Lactobacillus plantarum* Encapsulated with Skim Milk and Maltodextrin

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Keywords: Encapsulation · Maltodextrin · Probiotic · Skim-milk

Background/Aims: Two isolates of *Lactobacillus plantarum* were selected for determination of its probiotic characteristic. The aim of the study was to evaluate the effect of encapsulating material on survival of the probiotics after spray drying in simulated gastro-intestinal conditions and its viability during storage. **Methods:** Microparticles were produced from skim milk and maltodextrin (20% total solids) and they were inoculated with a biomass of *L. plantarum* prior to spray drying process at inlet and outlet temperatures of 120 and 70 ºC, respectively. Survival after spray drying of the microencapsulated and free cells of *L. plantarum* in simulated gastro-intestinal conditions (pH 2.0 and 0.5% bile solution) was evaluated. The samples were packed and stored at 4 ºC and room temperature and their viability was assessed after 30 days of storage. Data collected were analyzed statistically by ANOVA. **Results:** Encapsulating material significantly affected survival of probiotics after spray drying in simulated gastrointestinal conditions as well as viability after 30 days storage at 4 ºC and room temperature. The average survival number of probiotics in samples treated with skim milk and maltodextrin were 92.19 and 90.53%, respectively, which corresponded with probiotic count of 8.79 and 8.61 log cfu/gr, respectively. Microencapsulated *L. plantarum* exhibited a lower population reduction than free cells during exposure to simulated gastrointestinal conditions, with total population of 7.69 log cfu/g (pH 2) and 7.43 log cfu/g (bile salt), respectively. The remaining number of the probiotics after 30 days of storage at 4 ˚C and room temperature was 107 and 105 cfu/g, respectively. **Conclusions:** Both microencapsulation materials were effective in protecting the probiotics.

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Development of Android Application and Website for Nutrition Education on Balanced Nutrition Guideline for Elementary School Students

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Keywords: Nutrition education · Android · Website · Balanced nutrition guideline

Background/Aims: The aim of this study was to develop Android application and website for nutrition education on balanced nutrition guideline for elementary school students. **Methods:**

There were two media that were developed for the study: Android application and website. The two media consisted of story, interactive story, and educational games. The first step of media development was to determine the theme, which was balanced nutrition guideline. The next step was to create illustration using CorelDraw and Adobe Photoshop, which was continued with manufacture of the media. The Android application was developed by JavaTM and the website was developed by PHP. The media introduced principles of balanced nutrition guideline, application of those principles, and educational games consisting of five stages. The application was named EDGIAS. The media were set to be attractive and informative with easily comprehensible conversation, attractive colors, and simple layout.

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Nutrient Content and Glycemic Index of *Le Natura*: A Wholesome Fiber Chocolate Biscuit

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Keywords: Chocolate biscuit · Dietary fiber · Healthy snack · Glycemic index · Nutrient content

Background/Aims: Biscuits are common choice of snack to be consumed daily. However, availability of wheat-based products with low sugar and low glycemic index (GI) value in the market is still limited. Therefore, this study was carried out to determine nutrient composition and glycemic index of formulated wholesome fiber chocolate biscuit. **Methods:** The formulated biscuit samples, which comprised of oat, wheat bran, atta flour, and green bean flour, were analyzed for its chemical properties and blood glucose response. **Results:** The formulated biscuit was high in protein and dietary fiber, low in sugar, and contained appreciable amount of energy, iron, and calcium. Fifteen subjects participated in this study and they were requested to consume reference food and formulated biscuit (test food) after an overnight fasting on separate occasions. Both reference and test foods contained 50 g of available carbohydrates. Blood samples were obtained by finger-prick method immediately before (0 min as baseline) and 15, 30, 45, 60, 90 and 120 min after consumption of food. Meanwhile, blood glucose response was obtained by calculating the incremental area under the curve (AUC) to determine the GI value according to standard method. Overall, formulated biscuit demonstrated lower rise in postprandial blood glucose response, which produced low GI value (51.1 ± 5.5) when compared to the reference food (100) (p < 0.05). **Conclusions:** Le'Natura wholesome fiber chocolate biscuit not only provide significant nutritional value, but the GI value obtained also verified that this biscuit could be recommended as an alternative snack for inclusion in the diet of people suffering from diabetes as well as for healthy consumers who are concerned with their health.

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Antioxidant Activity of Dried Noodles Made from Binahong (*Andredera cordifolia* (Ten.) Steenis) Leaf Flour

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Keywords: *Binahong* · Noodles · Antioxidant

Background/Aims: Degenerative diseases can be caused by poor diet and high exposure to free radicals. Compounds that can delay, slow down, and prevent free radical oxidation reactions are called antioxidants. Some plants contain high antioxidants, for example *Binahong* leaves, a type of herbal plant common in Indonesia. In addition to antibacterial activity, *Binahong* leaves contain alkaloids, flavonoids, and saponins which are sources of antioxidants. *Binahong* leaves can be processed into various kinds of products, for example dried noodles. This research aimed to assess the antioxidant activity of dry noodles made from *Binahong* leaves. **Methods:** Four variations addition of *Binahong* leaf flour were used. Antioxidant activity was tested using the DPPH method. **Results:** There was a significant effect of the addition of Binahong leaf flour in noodles formulation (p = 0.000). The highest antioxidant activity was found in the sample formulated with the ratio of *Binahong* leaf flour and wheat flour of 40:60, which was 54.32%. Meanwhile, control sample only had 12.19% antioxidant activity. **Conclusions:** Increased addition of *Binahong* leaf flour in formulation of dry noodles resulted in higher antioxidant activity.

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Organoleptic Properties of *Emping* from Rambutan Seeds

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Keywords: Emping · Melinjo · Rambutan seed · Organoleptic properties

Background/Aims: *Emping* is a type of chips famous in Indonesia, usually made from melinjo (*Gnetum gnemon*) seeds. The aim of this research was to observe the sensory properties of *emping* made from rambutan seeds and to analyze the nutritional content and shelf life of it. **Methods:** Three ratios between melinjo and melinjo and rambutan seeds were used in the production of *emping* (2: 4, 3: 3, and 4: 2). Samples were analyzed with organoleptic test. Data collected were analyzed with ANOVA and Duncan's multiple range test **Results:** There was a significant effect of substitution of melinjo seed with rambutan seed on the organoleptic properties of *emping*, such as for texture, color, and taste. However, there were no significant differences among samples in terms of aroma and preference. The most accepted sample was the one made with the ratio of rambutan to melinjo of 4:2, which had crunchy texture, brown color, and lack of specific rambutan nor melinjo taste and aroma. The nutrient composition of the selected sample included 2.05% ash, 74.13% carbohydrate, 11.56% protein, 8.08% fat, 2.91% fiber, 16.70 mg/100 g vitamin C, and 1.26% tannins. Moreover, the sample was found to have shelf life of 121 days. **Conclusions:** Rambutan seed were found suitable to substitute melinjo seed in production of *emping* with relatively good sensory acceptance and nutrient profile.

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Effect of *Torbangun* Juice on Premenstrual Syndrome of Adolescents

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Keywords: Adolescent · Premenstrual syndrome · *Torbangun* juice · Water retention

Background/Aims: Premenstrual syndrome (PMS) is a physical and psychological problem that irritates women before the menstrual cycle. One of the effects of PMS is lower abdominal cramps caused by water retention (edema). One of the ways to reduce water retention could be by consumption of *Torbangun* juice (TJ) since it contains flavonoids that are diuretic. This study aimed to determine the effect of TJ on water retention in PMS. **Methods:** This study used randomized control trials with a sample of 40 young women (20 people for treatment and 20 people for the control group) and performed as a single blind trial. Data collected included the active ingredient contained in TJ, characteristics of the subjects, complains before menstruation (PMS) that were measured using the Shortened Premenstrual Assessment Form (SPAF). **Results:** There was a significant decrease (p < 0.05) for the PMS complains in the treatment group before (25.1 ± 7.10) and after drinking TJ (13.2 ± 6.3). In terms of complains of water retention, 36.8% of subjects previously experienced only mild water retention and after the intervention, the percentage increased to 94.7%. **Conclusions:** Complains related to PMS could be reduced better with treatment using TJ.

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The Role of Breast Milk Village in Improvement of Exclusive Breastfeeding and Reduction of Infant Undernutrition

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Keywords: Breast Milk Village · Exclusive breastfeeding · Malnutrition

Background/Aims: The low achievement of exclusive breastfeeding (11%) resulted in the prevalence of 0–6 months infants with undernutrition status up to 57% in Gemaharjo Health Center. It is the first Community Health Center in Indonesia that has a "Breast

Milk Village" program facilitated by nutritionists with activities as follow: village regulation on exclusive breastfeeding program, breastfeeding classes, breastfeeding chart, breast milk exercise, breastfeeding-supportive fathers, coins contribution, and wall posters on the importance of breastfeeding. This research aimed to improve the achievement of exclusive breastfeeding and reduce the number of infants aged 0–6 months with undernutrition status in Gemaharjo Health Center. **Methods:** Observation was carried out for 15 months and data collected were analyzed with One-Way ANOVA (p = 0.02 and p = 0.01). **Results:** "Breast Milk Village" program that was started from the first trimester of pregnancy and continued with childbirth up to the babies were 6 months old was found to be able to increase the achievement of exclusive breastfeeding (11% to 87%) and reduce the rate of infants with undernutrition status (4.7% to 1.1%) from a total subjects of 297 pregnant women. **Conclusions:** "Breast Milk Village" could increase the achievement of exclusive breastfeeding and reduce the rate of infant malnutrition.

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Dried Mushrooms Exposed to Pulsed UV-Radiation Generate Nutritionally Useful Concentrations of Dietary Vitamin D

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Keywords: Mushroom · Vitamin D · UV radiation
Background/Aims: There is a high prevalence of vitamin D deficiency in the Asia Pacific region and other parts of the world. Very few natural foods are a good source of vitamin D, with mushrooms as the only major non-animal source known to date. Upon exposure to ultraviolet (UV) radiation, mushrooms produce high levels of vitamin D, often in excess of 10 μg vitamin D/100 g fresh weight equivalent. This project assessed the efficiency of pulsed UV-radiation to generate D-vitamers in dried white button mushrooms (*Agaricus bisporus*). **Methods:** Freshly picked mushrooms (gills enclosed) were air-dried for 22 h, then exposed to 1–4 s of pulsed UV-radiation before being freeze-dried and analyzed by liquid chromatography triple quadrupole mass spectrometer. The concentrations of vitamins D2, D3, D4, 25-hydroxyvitamin D2, and 25-hydroxyvitamin D3 were measured in triplicate. **Results:** Vitamin D2 increased in a dose-dependent manner as UV-exposure increased (15, 26, and 32 μg/100 g for 1, 2, and 4 s respectively). A similar dose-dependent effect was seen for vitamin D4 (0.9, 1.7, and 2.6 μg/100 g for 1, 2, and 4 s respectively). Both 25-hydroxyvitamin D2 and 25-hydroxyvitamin D3 were below the limit of detection (LoD). All D-vitamers were below the LoD in control samples (no UV-exposure). **Conclusions:** UV-exposed dried mushrooms could be a nutritionally useful source of vitamin D, with 100 g fresh weight (about 3–4 medium mushrooms) providing more than the typical daily requirements for vitamin D (10–20 μg/day, depending on age). Pulsed UV-radiation offers an effective method for commercial production of vitamin D-enhanced dried mushrooms.

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TempeCal Cracker: Sensory Analysis and Nutrient Contents

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Keywords: Tempe · TempeCal · Cracker · Calcium
Background/Aims: Tempe is a highly nutritious fermented soy product that contains a moderate amount of calcium compared to milk. *TempeCal* is a product of tempe fortified with calcium that has been patented and it can be a source of calcium for those who do not take milk. This study aimed to develop *TempeCal* cracker (TC) based on varying percentages of *TempeCal* used in the formulation. **Methods:** Three different percentage (10, 15 and 20%) of *TempeCal* were used in the formulation of TC and they were compared to a control sample using normal tempe. This was followed by sensory analysis (hedonic preference test) to choose the most accepted formulation and food analysis to determine its nutrient content. Proximate analysis were carried out to determine the macronutrient while minerals were analyzed using Atomic Absorption Spectrophotometer. **Results:** There was no significant difference (p > 0.05) in terms of appearance, color, aroma, texture, saltiness, and bitterness among all samples. TC with 10% *TempeCal* was selected as the most preferred sample since it showed significantly (p < 0.05) higher scores for taste and overall acceptance as compared to TC with 20% *TempeCal*. Inclusion of 10% *TempeCal* produced crackers that contained significantly (p < 0.05) higher calcium (39.3 mg Ca/100 g) and potassium (155.0 mg K/100 g) compared to the control sample. Calcium content in TC with 10% *TempeCal* was three times higher (39.3 mg Ca/100 g) than that of the control sample (12.75 mg Ca/ 100 g). One serving of TC with 10% *TempeCal* (20 g crackers) could provide 94 cal, 2.7 g protein, 2.9 g fat, 14.3 g carbohydrate, 31.0 mg potassium, 9.3 mg magnesium, 77.5 mg sodium, and 7.86 mg calcium. **Conclusions:** Crackers containing *TempeCal* could be considered as a nutritious snack due to its low fat and calories, with moderate amount of calcium content.

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Effect of Methanol Extracts of Okinawan Vegetables on Cytokines Released From RAW264 Cells and Rat Footpad Edema

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Keywords: Okinawa vegetable · RAW264 · Inflammatory cytokines · Rat foot pad edema
Background/Aims: To determine anti-inflammatory effect of methanol extracts of Okinawan vegetable, this study examined pre-inflammatory cytokine productions from mouse macrophage cells (RAW264) as affected by addition of extracts of *Nishi-yomogi*, which was collected at Isigaki and Kume Island, and *Hosoba-*

wadan. In addition, the anti-inflammatory effect of the extracts was also observed in carrageenan-induced footpad edema animal model. **Methods:** Concentration of NO and cytokine of supernatant collected were assayed with Griess method and ELISA kit, respectively. Gene expressions of iNOS, COX-2, and NF-κB were estimated by quantitative PCR. In the study of footpad edema animal model, 6 week olds male SD rats were treated with intraperitoneal administration of extracts and edema was induced by injection of carrageenan on right footpad. Footpad volume before and after administration of carrageenan were measured. Data are presented as means ± SEM. The statistical significance of difference was evaluated by Tukey-Kramer HSD test. Differences at p < 0.05 were considered to be significant. **Results:** Production of NO and TNF-α in the *Kume Nishi-yomogi* group were significantly lower (p < 0.05) than those of other groups. Moreover, IL-6 production in the *Kume Nishi-yomogi* group was significantly lower (p < 0.05) than that of control group. The iNOS and COX-2 expressions of *Kume Nishi-yomogi* group were significantly down regulated (p < 0.05) compared to other groups. While the footpad edema of rats administered with *Kume Nishi-yomogi* extract showed no significant difference between groups, although there was a tendency of decreased edema observed in the *Kume Nishi-yomogi* group. **Conclusions:** *Nishi-yomogi* from Kume Island might be effective in alleviating inflammation.

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Torbangun Leaf Snack Bar: An Alternative Source for Iron and Calcium For Breastfeeding Mothers in Post-Disaster Refugee Camp

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Keywords: *Torbangun* · Snack Bar · Iron · Breastfeeding
Background/Aims: Indonesia is prone to natural disaster. In 2018, there were earthquakes in Lombok and Palu. When disaster strikes, it is difficult for victims to meet their nutrient needs, especially for micronutrients such as calcium and iron. For breastfeeding mothers, the condition is worsen by their higher needs of micronutrients, thus they are in risk of anemia and decreased production of breast milk. Furthermore, it may induce undernutrition among infants and toddlers due to the lack of sufficient breast milk produced by their mothers. *Torbangun* leaves contain lactogogum, which can stimulate the mammary glands to increase production of breast milk. The objective of this study was to develop a flour-based snack bar made from *Torbangun* leaves that are high in calcium and iron. Snack bar was selected due to its practicality in consumption, storage, and transport, which is highly needed in an emergency situation such as natural disasters. **Methods:** The experiment was conducted using a completely randomized design. *Torbangun* leaf flour was added to the formulation of the snack bar at the following amounts: 10 g (F1), 15 g (F2), and 20 g (F3). **Results:** The most preferred sample in the organoleptic test was F1, which contained 10.9% moisture, 2.8% ash, 9.6% protein, 10.43% fat, 66.3% carbohydrate, 1006.54 mg calcium, and 44.76 mg iron, with an energy content of 397.47 kcal/100 g. A single portion (100 g) of the *Torbangun* snack bar provided 25.8% calcium and 43.8% iron from the RDA of breastfeeding mothers. **Conclusions:** *Torbangun* leaf flour could be used to improve nutrient profile of snack bars, which could be used to fulfill the nutrient needs of breastfeeding mothers post-disaster.

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Mixed Drink Formula from *Tolo* Beans, Corn, and Moringa Leaf (*Moringa oleifera*) and Its Effect on Decreasing Malnutrition Status in Children Aged 24–59 Month

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Keywords: Mixed drink · Malnutrition · Children aged 24–59 month
Background/Aims: Underweight is the outcome of insufficient food intake and recurrent infectious diseases. A mixed drink formula from *Tolo* beans (black-eyed peas), corn, and *Moringa* leaf can be offered as an alternative food to overcome malnutrition. These ingredients do not only have good nutritional value, health benefits, and consumer acceptance, but they are also conveniently available locally in Indonesia. This study aimed to analyze the effect of mixed drink formula made of *Tolo* beans, corn, and *Moringa* leaf towards improvement of nutritional status of children aged 24–59 month. **Methods:** The experiment was conducted using pre and post randomized controlled group design. Treatment group (n = 29 children) were given 250 cc of the mixed drink formula of *Tolo* beans, corn, and *Moringa* leaf every day for months, whereas the control group (n = 28 children) were provided with 250 cc of placebo. Measurement of nutritional status was performed by anthropometric examination and food intake was assessed using 24-h food recall that was taken before and during the intervention. **Results:** There was a decrease in malnutrition status based on W/H, W/A, and H/A after the intervention in the treatment group, but similar effect was not seen in the control group. Before The values of W/H, W/A, and H/A before the intervention were 7.1, 17.3, and 35.7%, respectively, which decreased to 3.4, 14.3, and 32.1%. The product also contributed to energy intake (148 ± 12.01 kcal) and protein intake (4.96 ± 1.13 g). **Conclusions:** Mixed drink made from *Tolo* beans, corn, and *Moringa* leaf could be used as an alternative nutritional support for children aged 24–59 month who suffered from malnutrition.

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Effect of Resistant Starch on Physicochemical and Nutritional Qualities of Thai Shortbread Cookies

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Keywords: Resistant starch · Fortification · Glycemic index · Shortbread cookies

Background/Aims: Resistant starch (RS) can resist digestion in the gastrointestinal tract and thus it is often applied as dietary fiber ingredient in food products. Consumption of RS type 2, which is highly-crystalline native starch granules, can improve insulin sensitivity in overweight and obese men and women. Therefore, this study aimed to determine the effect of the use of resistant starch on characteristics of Thai shortbread cookies. **Methods:** This study determined the physicochemical and nutritional qualities of Thai shortbread cookies (TSB) fortified with RS type 2. A commercial RS type 2 was used for partial substitution (40–70%) of wheat flour in the control TSB. **Results:** Substitution of wheat flour with RS led to TBS with lighter (higher L*) and less red (lower a*) color. RS-fortified TSB had lower water activity, moisture content, hardness, and fracturability than the control formula (p ≤ 0.05). Such changes were caused by the discontinuous and irregular gluten matrix formed around non-gelatinized RS granules, which was confirmed by microstructure analysis using scanning electron microscopy. Sensory evaluation using 5-point Just-About-Right scale suggested that flour substitution with RS positively affected the suitability of color and texture of TSB. RS content, determined from glucose released during simulated digestion, of TSB with 60% flour substitution level was 14.5 g/ 55 g serving, which is the effective dose of RS to provide positive health benefits without causing gastrointestinal discomfort. Consumer acceptability, intention to consume, microbial safety, and shelf stability of the control and RS-fortified TSB were similar. In vitro estimated glycemic index of TSB decreased from 82.60 to 63.21, making the product to be a medium glycemic index. **Conclusions:** Substitution of wheat flour with RS type 2 in TSB formulation could be utilized as a healthy snack choice for overweight and obese adults in Thailand.

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Development of Powdered Functional Drink from Coconut (*Cocos nucifera*) as An Alternative Beverage Product with Low Risk against Diabetes Mellitus

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Keywords: Coconut powder · Sensory analysis · Chemical properties · Freeze dryer

Background/Aims: Diabetes mellitus is a group of metabolic syndrome characterized by high blood glucose level (hyperglicemia) caused by impairment of insulin secretion, insulin effectivity, or both of them. Coconut water has beneficial nutrients that can help decrease risk of diabetes. However, it is highly perishable. The purpose of this study was to analyze sensory acceptance and physicochemical properties of powdered functional drink from coconut. **Methods:** The experiment was conducted using randomized block design with two coconut varieties (hybrid and tall) and two maturity ages (4 and 6 months). The functional drink was prepared from mixture of coconut meat and coconut water at a ratio of 1:2 and it was produced into powder using freeze drying technique. Sensory analysis was performed using rating and ranking test with 36 semi-trained panelists. Characteristics such as proximate composition and several physical properties were also determined from the samples. **Results:** The powdered functional coconut drink had organoleptic properties that almost resembled with the fresh product, including color, flavor, texture, taste, mouthfeel, and after taste. The powdered sample had 11.71% water, 8.88% fat, and 14.45% protein. **Conclusions:** Powdered functional drink from coconut had similar sensory and chemical properties with the fresh one, thus it could be produced as an alternative beverage product suitable with people with diabetes.

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Nutrients Content of Complementary Feeding Mixed of Flour of Rice, Awak Banana, Red Bean and Herbal Chicken Feet

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Keywords: Complementary feeding – Awak banana – Red bean – Herbal chicken feet

Background/Aims: Growth barriers mostly occur in children before reaching the age of 2 years, that is, in the most important period for the process of growth and development of children. Factors that cause growth restriction in this period, among others, are related to the practice of complementary feeding (CF) which is low in quality and quantity. Efforts to improve the quality of CF can be done through diversifying potential foodstuffs. This article will expose about the nutrients content of the development CF made from a mixture of rice flour, 'awak' banana, red beans and herbal chicken feet. **Methods:** This study was conducted using a completely randomized design to determine the nutrients content of CF formulas: 1) the formula TBKC, which was a mixture of rice flour (30%), red bean flour and herbal chicken feet (40%), and carrots (5%)); 2) the formula TBPKC, which was a mixture of rice flour and 'awak' bananas (30%), red bean flour and herbal chicken feet (40%), and carrots (5%). **Results:** The results showed TBPKC and TBKC formula have a water contents 4.36% and 4.22%, protein 14.47% and 14.34%, fat 9.93% and 11.03%, carbohydrates 61.52% and 58.74%, energy 388.57 kcal and 387.14 kcal, vitamin A 270.28 µg and 330.36 µg, Ca 1.55% and 1.1%, P 0.69% and 0.59%, Fe 17.06 mg and 20.88 mg, Zn 5.9 mg and 6.0 mg. The nutrients content in the TBKC and TBPKC formulas were in accordance with the provisions stated in BPOM Regulation No. 1 of 2018, However, based on the ratio of Ca/P TBKC formula does not qualify.

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The Physicochemical Properties of Newly Developed Nutritionally Complete ONS Using Tapioca-Starch Maltodextrin De7 and De19

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Keywords: Oral nutritional supplement · Tapioca- starch maltodextrin · Dextrose equivalent

Background/Aims: Recently, tapioca-starch maltodextrin (TM) has been developed by enzymatic method with varied Dextrose Equivalent (DE) values, which may influence the physicochemical characteristics of the product produced from it. This study aimed to examine the physicochemical properties of newly developed nutritionally complete ONS, by using TM-DE7 and TM-DE19 as a carbohydrate source. **Methods:** According to Thai dietary references intake (Thai-DRI), two polymeric nutritionally complete ONS formulas containing TM, whey protein isolate, rice bran oil, vitamin and mineral powder mix were developed. One of the formulas contained TM-DE7 and the other one had TM-DE19. Viscosity, pH, and color were examined from samples. **Results:** Both formulas contained the same amount of energy as 250 kcal/250 ml. The macronutrients distribution was 55:15:30 (carbohydrate: protein: fat). These formulas provided 36 g carbohydrate, 10 g protein, and 9 g fat (5.8% of total energy from saturated fatty acid, 11.6% from monounsaturated fatty acid, and 10.3% from polyunsaturated fatty acid), which complied with the Thai DRI. Sample with TM-DE7 had a significantly higher viscosity (34.48 ± 0.85 cP) compared to the sample with TM-DE19 (31.98 ± 1.11 cP) p-value <0.05. There was no significant difference in pH values between sample with TM-DE7 (6.31 ± 0.05) and TM-DE19 (6.29 ± 0.07) formulas. **Conclusions:** Both TM-DE7 and TM-DE19 could be used as a carbohydrate source for development of nutritionally complete ONS, since viscosity and pH remained within the recommended ranges. However, a consumer sensory test needs to be performed in the future to examine the palatability and acceptability of the products.

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Reduction of Sodium Intake from Papaya Salad with the Use of Sodium-Reduced Fermented Fish in Producing Traditional Seasoning Sauce

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Keywords: Fermented fish · Sodium · Papaya salad

Background/Aims: Fermented fish is commonly used as seasoning sauce in northeastern Thai and Laos to provide salty taste in foods. Nowadays, it is used as a basic ingredient for preparing various seasoning sauces for many types of local dish. This study aimed to observe the effect of using sodium-reduced fermented fish (SRFF) in traditional papaya salad on reduction of sodium intake among consumers. **Methods:** Fermented fish, produced from fresh water fish with either normal salt (FF) or 60% sodium-reduced salt (SRFF), was used for production of seasoning sauce for papaya salad by local sauce producers. The sauce made from FF or SRFF was then used by local street food vendors as the main ingredient for preparing their papaya salads. Sodium content in FF, SRFF, sauce, and papaya salad were analyzed using Atomic Absorption Spectrometer. The significant differences between sodium contents in sauces and papaya salads were evaluated by using t-test. **Results:** The sample with SRFF contained sodium at 52% less than the one with FF, while sodium in the sauce from SRFF was 40% less than the one from FF. The sample of papaya salad prepared from SRFF sauce contained 493 + 26 mg/100 g sodium per 100 g, which was 33% lower than the one prepared from FF sauce. **Conclusions:** The use of SRFF could significantly reduce sodium contained in traditional papaya salad by up to one-third. This might be beneficial to lower the risk of hypertension with minimum change on the eating behavior of the northeastern Thais and Laotians.

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Modulation Patterns of Homeostatic and Hedonic Appetite in Daily Life of Japanese Female University Students

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Keywords: Homeostatic appetite · Hedonic appetite · Menstrual cycle · Energy balance

Background/Aims: This study investigated the daily changes of food-specific appetite in 31 Japanese healthy young females for two 7-day free-living sessions during the follicular and luteal menstrual cycle phases. **Methods:** During the sessions, participants were instructed to record visual analog scales (VAS) of appetites for 25 standard Japanese food groups several times a day, mainly before and after meals. Arousal and mood states (9×9 affect grids), food intake (mobile phone photographs and text messages), and

physical activity (Actigraph, AMI) were recorded simultaneously. To extract predominant patterns from 25 food-specific appetites, principal component analysis (PCA) was applied to the VAS data on appetites specific for all 25 food groups for each participants. **Results:** PCA showed 2 dominant patterns of food-specific appetites. The largest principal component (PC1) increased before meals and decreased after 3 meals in the morning, early afternoon, and evening during a single day. PC1 was highly correlated with appetites specific for "staple foods," "main dishes," and "side dishes." The second largest principal components (PC2) did not change systematically during a single day but the scores of PC2 were higher during the luteal phase than follicular phase. PC2 was correlated with appetites specific for "desserts & snacks" and "beverages." PC1 might represent homeostatic appetite because it was modulated depending on participant's internal energy balance, while PC2 might be considered for hedonic appetite because it was largely affected by the participant's menstrual cycle. **Conclusions:** Daily changes of food-specific appetite in women of child-bearing age could be related to their food intake throughout the day as well as their menstrual cycle.

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Post-Natal Nutritional Care with Social Media Technology

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Keywords: Media technology · Postpartum · Nutrition
Background/Aims: Postpartum care is a unique culture in Asia. In Changhua City, Taiwan, the Walvoord Postpartum Nursing Center, founded by Changhua Christian Hospital, provides a comfortable, bright environment, and professional medical care to help mothers nursing their bodies and quickly recover their vitality. This study aimed to develop and evaluate a social media technology used for nutrition care process. **Methods:** The nursing center provided a balanced postpartum nourishment diet that met the needs of mothers based on a food service system certified with ISO22000 and HACCP. During their residency at the centre, the mothers were introduced to nutrition information through a communication application (Line), where the day's meal design concept and inspection reports had been uploaded to cloud space, so that they can be browsed any time. If there were problems, a dietitian would provide feedback using one-on-one interaction through the application. Monthly group education on nutrition for lactation period and non-staple food intervention were held. **Results:** A total of 72.4% out of 89 respondents used the social media intended for the study. Ninety two questionnaires were collected in 5 months and the results showed satisfaction level for meals provided was 93.5%, for intelligent nutritional care was 98.9%, and for group education was 100%. **Conclusions:** Nutrition plays a crucial role for postpartum care and the use of media technology in nutrition care process could be an effective way to improve the quality of the care.

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Effect of Water Temperature on Bread from Gluten-Free Rice Flour

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Keywords: Gluten-free · Rice flour bread · Wheat allergy · Gelatinization of starch · Gluten intolerance
Background/Aims: In recent years, demand for bread from gluten-free rice flour has been increasing in order to cope with wheat allergy and gluten intolerance. Since rice flour does not contain gluten, which is important for dough rising, the quality of gluten-free rice flour bread is not adequately similar to normal bread from wheat flour. Therefore, gluten-free rice flour bread usually requires gluten substitutes, such as thickening polysaccharides. A preliminary study has found that the addition of hot water to dough promotes gelatinization of starch and helps dough rising, thus gluten substitutes became unnecessary. This study aimed to determine effect of water temperature on gluten-free rice flour bread. **Methods:** Gluten-free rice flour dough was prepared without the use of gluten substitutes using hot water at 40–80°C. Gelatinization of starch was determined by β-amylase-pullulanase method. Dough form was observed by electron microscopy. Physical properties measurement and sensory evaluation of the bread samples baked from gluten-free rice flour dough were also performed. **Results:** When water temperature was higher than 70°C, the starch was over-gelatinized thus lowering the quality of the baked bread. Meanwhile, when the temperature was between 50 and 70°C, there was moderate gelatinization of starch and the quality of the baked bread produced was acceptable. **Conclusions:** Bread from gluten-free rice flour could be produced without using gluten substitutes simply by adding warm water set at 50–70°C. Thus, an alternative bakery product could be produce for those having wheat allergy or gluten intolerance.

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Tempeh-Based Food Product Development For Optimizing Pregnancy Outcome

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Keywords: *Tempeh* drink · *Tempeh* cookies · Pregnancy
Background/Aims: To obtain healthy pregnancy and optimal fetus development, it is essential that nutritional needs get fulfilled. Studies showed that supplementary feeding during pregnancy is an effective strategy to achieve this goal. The present study aimed to develop tempeh-based cookies and drink as supplementary food designed for optimizing pregnancy outcomes and fetus development. **Methods:** We creates 4 formula for instant tempeh drinks with different proportions of skim milk contain in each formula. And also 4 formula for tempeh cookies with different formula-

tions. From four formula then was chosen one formula based on acceptance of the products. Kruskal Wallis test was used to see the difference between formulas in the hedonic test. The nutrient content of cookies obtained from chemical analysis. **Results:** The products contained 17 essential amino acids as well as omega-3, omega-6, and omega-9 fatty acids. Folic acid content in tempeh cookies and drink were 2710 and 712 μg/100 g product, respectively. The contribution of tempeh cookies to nutrient needs of pregnant women per serving size (80 g) cookies were 15.8% of energy, 12.1% of protein, 24.4% of fat, 12.6% of carbohydrate, and 21.4% of calcium. The sensory test showed that the color and aroma of the cookies were accepted. Meanwhile, the contribution of tempeh drink to nutrient need of pregnant women per serving size (30 g) were 4.4% of energy, 9.8% of protein, 0.8% of fat, 5.5% of carbohydrate, and 14% of calcium. The sensory test showed that the drink had good acceptance for color, while its taste still needed to be improved. Provision of both products, one portion each, will contribute to 20% energy and 21% protein need of pregnant women. **Conclusions:** An intervention study by providing these products to pregnant women needs to be conducted to determine their efficacy in improving pregnancy outcomes.

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The New Era of Nutrition Consultation: Design and Implementation of Web-Based Nutrition Consultation

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Keywords: Nutrition counseling · Online nutrition counseling · Web-based nutrition counseling
Background/Aims: The number of internets user in Indonesia has increased rapidly from 88.1 million users in 2014 to the current number of 132.7 million or about 51.5% of the total population of Indonesia. Based on the need to update the conventional method of nutrition consultation, this study was aimed to determine the feasibility, usefulness, ease of use, and customer satisfaction of online nutrition consultation. **Methods:** The research used a combination of experimental and survey. It was conducted at the Software Engineering Laboratory, Information Technology Department, State Polytechnic of Jember. Results of the web consultations were accessed through the website (www.ahligizi.id) developed, where there were five categories of service to choose from: question archives, nutritionists, nutrition articles, and a calculator. **Results:** All parts of the main menu of the website could run well without obstacles. The online nutrition consultation could overcome problems in nutrition consultations that often happened when they were conducted conventionally. **Conclusions:** With nutrition consultation, nutritionists could improve their active role in supporting healthy lifestyle and prevention of diseases in the community.

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Effect of Substitution of Wheat Flour with Modified Taro Flour (Motaf) on In Vitro Starch Digestibility of Brownies

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Keywords: α-amylase · Starch digestibility · Taro · Modified taro flour
Background/Aims: Studies reporting utilization and information on nutrient content of taro from Lamandau Regency is still lacking. Development of taro into modified taro flour is an effort to improve its sensory quality and nutrient value. This study aimed to analyze the effect of substitution of wheat flour with modified taro flour (Motaf) on in vitro starch digestibility of brownies. **Methods:** The experiment was conducted with completely randomized design (CRD). Motaf was produced by fermentation with a yield of 24% of fresh taro. Brownies samples were produced with the following ratios of wheat flour and Motaf: K(100:0), F1(50:50), F2(25:75), and F3(0:100). Analysis of starch digestibility was performed in vitro using α-amylase. **Results:** Fresh taro and Motaf had starch digestibility values of 20.76 and 89.84%, respectively. For brownies samples of K, F1, F2, and F3, the digestibility values were 20.76%, 19.22%, 17.26% and 16.40%. ANOVA test showed that the substitution of wheat flour by Motaf significantly affected the digestibility of starch brownies ($p < 0.05$). Further post-hoc test showed that higher substitution of wheat flour with Motaf significantly lowered the starch digestibility ($p < 0.05$). Hedonic test showed that brownies samples were acceptable up to 100% Motaf substitution. **Conclusions:** Substitution of wheat flour with modified taro flour could help reduce digestibility of starch in brownies.

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Organoleptic Properties and Nutritional Value of Rambutan Seed Nougat

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Keywords: Nougat · Seed · Organoleptic · Rambutan
Background/Aims: Nougat is known in Indonesia as a ground peanuts-based product called *Ting-Ting*. The objectives of this study were to determine the organoleptic nougat made from rambutan seeds, including texture, color, odor, taste, and overall preference, and to evaluate the nutritional content of the sample in terms of ash, carbohydrate, protein, fat, fiber, vitamin C, and tannin content as well as its shelf-life. **Methods:** This research utilized rambutan seeds as substitution to ground peanuts at 25, 50, and 75% in production of *ting-ting*. Samples were analyzed with organoleptic test and chemical tests. **Results:** The organoleptic test showed samples produced had crunchy texture, and dark brown color, with no rambutan taste nor flavor. The selected sample had 2.36% ash, 74.88% carbohydrate, 10.78% protein, 9.11% fat, 2.86% fiber, 20.5 mg/100 g vitamin C, and 1.14% tannins. It was also

shown to have a shelf life of 119 days. **Conclusions:** Rambutan seeds have potentials to be used in production of food products, such as nougat.

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The Efficacy of a Diet Survey Method Using the Social Network Service LINE® Application: A Quasi-Randomized Controlled Trial

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Keywords: Social network service · LINE application · Diet survey

Background/Aims: This study investigated the efficacy of the social network service "LINE®" application, as a diet survey method. **Methods:** The research was conducted as a quasi-randomized controlled trial. Healthy female students were assigned to three groups: an interview with the paper-based diet record (D) group, an e-mail-based food photograph and message (E) group, or a LINE-based photograph and message (L) group. Each group member recorded and submitted their diet contents for three days. The primary outcome was the difference in intake calculation: total energy, proteins, lipids, and carbohydrates. Intergroup differences were analyzed through analysis of variance. A total of 86 participants were assigned to D group (n = 29), E group (n = 32), or L group (n = 25), while three students refused to participate. One participant in the D group, nine in the E group, and two in the L group dropped out. **Results:** Total energy consumed was 1594 ± 252 kcal (D group), 1552 ± 28 kcal (E group), and 1422 ± 359 kcal (L group), with p value = 0.15). Protein consumption was 51.9 ± 13.2 g (D group), 59.4 ± 14.0 g (E group), and 47.7 ± 16.5 g (L group), with p value = 0.07, while lipid consumption was 52.6 ± 13.3 g (D group), 51.6 ± 14.7 g (E group), and 47.1 ± 13.0 g (L group), with p value = 0.30. Meanwhile, carbohydrate consumption was 205.0 ± 29.3 g (D group), 193.8 ± 36.5 g (E group), and 182.8 ± 55.3 g (L group), with p value = 0.18. **Conclusions:** This study managed to identify the efficacy of the LINE® application as a diet survey method.

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Rice Protein Depresses DNA Damage by Activating P53 Pathway in Adult Rats

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Keywords: Rice protein · DNA damage · p53 pathway · Adult rats

Background/Aims: Rice protein is a major plant protein widely consumed in the world. The aim of this study was to elucidate the effects of rice protein on depressing DNA damage in adult rats. **Methods:** Adult male Wistar rats were fed casein and rice protein for 2 weeks. Hepatic contents of p53 and 8-hydroxydeoxyguanosine, the mRNA levels and protein expressions of p53, ataxia-telangiectasia mutated (ATM), Checkpoint kinase 2 (Chk2) and Murine Double Minute 2 (MDM2) were measured after 2 weeks of feeding. **Results:** Compared to casein, rice protein significantly reduced hepatic accumulation of 8-hydroxydeoxyguanosine, whereas hepatic content of p53 increased with the intake of rice protein. The mRNA levels and protein expressions of p53, ataxia-telangiectasia mutated (ATM), and Checkpoint kinase 2 (Chk2) were upregulated by rice protein, whereas Murine Double Minute 2 (MDM2) expression was markedly inhibited by rice protein feeding, resulting in more p53 that were translocated into the nucleus. **Conclusions:** The present study demonstrated that rice protein could depress DNA damage through activation of ATM-Chk2-p53 pathway in adult rats.

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Development of Digital Food Photographs as a Tool to Visually Estimate Food Portion Size in Multi-Ethnic Malaysian Adults

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Keywords: Digital food photographs · Malaysia · Multi-ethnic · Adults

Background/Aims: Unreliable food portion size estimation is one of the causes of under reporting in dietary surveys. Digital food photograph is a set of photograph series depicting different amounts of food that can be used to describe portion sizes. This study aimed to develop digital food photographs for multi-ethnic Malaysian adults and discuss its usage, advantages, and limitations. **Methods:** A total of 244 commonly consumed foods in Malaysia that were recognized by a local nutritional survey, market survey, and interviewing nutrition experts, were used in the study. In obtaining food items, certain dishes were prepared according to a standard recipe book, while other items were purchased from recognized restaurants and local markets. White crockery on with white background was used to present the food items and they were photographed using a camera setup recommended for food photography. Three types of digital photographs were used to show the food items i.e. serial (71%), range (25%), and guide (4%). **Results:** Three types of digital photographs were used to show the food items i.e. serial (71%), range (25%), and guide (4%). Mainly all digital photographs of foods (n = 217) were captured using a camera placed at an angle of 42° to represent the view of a person of average height, sitting at a table, and looking at a plate on the table in front of him/her. The liquid portion series (n = 27) were photographed at an angle of 90° to get life-size images. **Conclu-

sions: Digital food photographs could be a valuable resource for development of electronic dietary assessment tools in Malaysia as well as in other South East Asian countries where similar foods are consumed.

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Isolation and Characterization of Antimicrobial-Producing Bacteria Associated with Milkfish (*Chanos chanos*)

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Keywords: Isolation · Characterization · *Streptomyces* · Milkfish · Antimicrobials

Background/Aims: Milkfish (*Chanos chanos*) is one of the most common aquatic cultivated fish that is widely consumed in Indonesia. Its good taste and high nutritional content make the demand for this type of fish increased every year, which unfortunately led to increased amount of waste, such as innards (gut). A previous research reported the existence of antimicrobial-producing bacteria in the gut of milkfish, which was then identified as *Streptomyces* sp. These bacteria are a group of filamentous bacteria that produce antimicrobial compounds, which can inhibit the growth of spoilage and pathogenic bacteria in foods. The purpose of this study was to isolate and characterize antimicrobial-producing bacteria associated with milkfish. **Methods:** Isolation of bacteria from the gut of milkfish resulted in 38 isolates, which had specific morphological characteristics similar to *Streptomyces* sp. **Results:** Based on the antimicrobial activity test by double layer agar diffusion assay, 16 isolates out of 35 isolates discovered different inhibitory activities on 4 test bacteria *S. aureus, E. coli, B. subtilis* and *P. aeruginosa*. **Conclusions:** Innards of milkfish could help to be used in producing antimicrobial-producing bacteria.

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Elements Characterization in Rice Flour and Fish Meal Samples

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Keywords: Rice flour · Fish meal · NAA · AAS

Background/Aims: Nowadays, nutrition is an important issue in many developing countries. Lack or excess of macro and micro elements in food can interfere with human health. Therefore, food safety needs a reliable analytical method that offers high accuracy and precision. This study aimed to characterize toxic elements (As, Pb, Cd, Hg) and essential elements (Na, K, Ca, Mg, Fe, Cu, Zn) in rice flour and fish meal using Neutron Activation Analysis (NAA) and Atomic Absorption Spectrophotometry (AAS). **Methods:** Samples were provided by The Asia Pacific Food Analysis Network (APFAN). Three replications were prepared and probability of contamination was reduced. The samples were digested using microwave digestion to avoid loss of volatile elements from the samples since AAS needed homogenous liquid samples. Data were evaluated based on Z-score value with 3 categories: satisfactory, questionable, and unsatisfactory. **Results:** Both methods had satisfactory results in rice flour where the Z-score values of K, Ca, Zn were <2, meanwhile AAS gave the values from the same samples for Mg, Fe, Cu, Cd to be <2. Meanwhile, NAA gave the Z-score of 2<Mg<3 in rice flour. Satisfied performance was found in fish meal sample that had Z-score values of K, Ca, Mg, Fe, Zn at <2 for both methods. Values of Na<2 and 2<Hg<3 were obtained from NAA in fish meal sample and Z-score of As was <2 with AAN. Moreover, the value of 2<Pb<3 was obtained from AAS in fish meal sample. **Conclusions:** AAN and AAS could provide an accurate and precise analysis of elements in rice flour and fish meal.

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Randomized-Controlled Trial of Experiential Healthy Meal Preparation (KidChen Study) among Children in Improving Nutritional Outcomes: A Study Protocol

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Keywords: Healthy meal preparation · Experiential learning · Intervention · Nutrition · Children

Background/Aims: With the rapid rise of childhood obesity worldwide, an innovative strategy is essential to instill healthy dietary behavior in children. Children's excitement over food preparation is an opportunity to harness this energy into changing nutrition-related behavior. Hence, this study aimed to observe effects of a 3-month experiential learning intervention on healthy meal preparation and followed by another 3-month follow-up. **Methods:** KidChen Study was a randomized-controlled trial aimed to improve nutritional outcomes in children. Two schools in Kuala Lumpur, Malaysia were randomly selected and assigned to either intervention or control group. Eligibility criteria included children aged 10 to11 with no co-serious morbidities or food allergy. KidChen Study was based on Social Cognitive Theory that addressed personal, environmental, and behavioral factors, comprising of one 60-min module for parents related to home food environment and five 60-min interactive nutrition education modules for children that consisted of hands-on healthy meal preparation activities and recipe creation aimed for the children and their parents at home. Outcomes measured include children's psychosocial factors towards healthy meal preparation (knowledge, attitude, practice,

self-efficacy), dietary behavior (consumption of common food groups, breakfast, fast food consumption, meal skipping), home food availability, and anthropometry measurements (BMI z-score, body fat percentage, waist circumference). General linear model was used to determine the effectiveness of KidChen intervention. **Results:** KidChen Study represents an innovative approach in improving children's behavior towards nutrition and subsequently, their nutritional outcomes. **Conclusions:** This intervention would enhance children's nutritional knowledge and skills, which would positively impact their health in long run.

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Utilization of Seaweed as a Source of Minerals and Polyunsaturated Fatty Acids (PUFA) in Cookies for Lactating Women

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Keywords: Cookies · Breast-milk · Mineral · Omega-3-fatty-acids

Background/Aims: Although seaweed only contains a small amount of fat, its PUFA content is better than that of other plants. Seaweed also contains minerals, vitamins, protein, and fiber, which can be used to produce nutritious food products for lactating women. The purpose of this study was to determine the effect of seaweed cookies on fatty acid profile of breast milk. **Methods:** The study was conducted by processing seaweed to be used as raw material for production of cookies. The cookies were then provided to 10 lactating women as the subjects. Each subject received 1 pack (120 g) of the cookies every day for 10 days. The parameters observed were nutritional status, food intake, and fatty acid profile of breast milk before and after intervention. **Results:** Each serving of the cookies contained 500 kcal with nutritional adequacy rate of 23% carbohydrate, 18% protein, 42% fat, and 26% fiber. The cookies also contained minerals such as calcium, iron, and iodine at nutritional adequacy rate of 20, 20, and 55%, respectively. The most frequently consumed sources of fatty acids for the subjects were from poultry (7 times/month) and saltwater fish (3 times/month). Fatty-acid profiles before and after the intervention in terms of % total fatty acids showed an increasing trend i.e. for n-3-PUFA (0.47% to 0.595%), LA (0.35% to 0.37%), EPA (0% to 0.04%), and DHA (0.012 to 0.16%). While n-6-PUFA did not change before and after the study. **Conclusions:** Seaweed cookies could be used as snack for lactating women to increase nutritional value of their food intake, especially in terms of minerals and polyunsaturated fatty acids.

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Effects of Addition of Banana (*Musa paradisiaca*) Blossom on Nutritional Profile and Dietary Fiber Content in Shredded Chicken

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Keywords: Shredded chicken · Banana blossom · Dietary fiber · Nutritional

Background/Aims: Banana (*Musa paradisiaca*) blossom is a popular vegetable in Indonesia that contains high dietary fiber. High consumption of dietary fibre could help prevent non-communicable diseases, such as cancer, cardiovascular diseases, and diabetes. This study was carried out to evaluate the effect of addition of banana (*Musa paradisiaca*) blossom on nutrition profile and dietary fiber content of shredded chicken (*abon*). **Methods:** Chicken meat was substituted with banana blossom at ratios of 25:75 (F1), 50:50 (F2), and 75:25 (F3) to produce shredded chicken. **Results:** There was no significant differences (p > 0.005) samples in terms of their moisture, ash, carbohydrate, soluble dietary fiber (SDF), insoluble dietary fiber (IDF), and total dietary fiber (TDF) of the samples, which ranged 4.39–9.38, 2.47–4.04, 24.52–45.36, 0.45–0.50, 13.33–13.77, and 13.78–14.28%, respectively. Meanwhile, fat and protein contents decreased. **Conclusions:** Substitution of chicken with banana blossom in production of shredded chicken could increase the level of soluble and insoluble dietary fiber in the samples.

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Consumption of Rice Vermicelli Soup with Catfish (*Pangasius hypopthalamus*) Bone Flour Addition to Increase Food Intake of Stunting Toddlers in Riau, Indonesia

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Keywords: Catfish bone flour · Rice vermicelli soup · Stunting toddler

Background/Aims: Stunting is one of the main problems related to toddlers; especially in low and medium income countries include Indonesia. One of the ways of intervention is to provide rice vermicelli soup with catfish bone flour ingredient. This study aimed to analyze the influence of rice vermicelli soup provision with catfish bone flour ingredient to increase nutrient intake (protein, calcium, and phosphor) of stunting toddlers. **Methods:** A quasi experiment was conducted from March to July 2018 in Riau, Indonesia. The study involved 60 stunting toddlers, which were divided into intervention group and control group. The data was processed and analyzed with Linear Regression. **Results:** There was significant differences (p = 0.000) in terms of average nutrient intake of protein, Ca , and P between the control group and the intervention group. Protein intake increased from 23 ± 3 g to 46 ±

3 g in intervention group as compared to 23 ± 5 g to 25 ± 3 g in control group; Ca intake also increased in the intervention group from 602 ± 123 mg to 1005 ± 133 mg as compared to the control group that increased from 599 ± 123 mg to 610 ± 133 m; and another increase was also seen in P intake that was higher in the intervention group from 355 ± 123 mg to 525 ± 134 mg as compared to control group that went from 357 ± 123 mg to 359 ± 12 mg. There was also a significant effect (p < 0.005) of provision of rice vermicelli soup enriched with catfish bone flour on food intake (r = 0.67), which showed provision of rice vermicelli held 67% responsibility in increasing the toddlers' food intake. **Conclusions:** Rice vermicelli soup with catfish bone flour addition could help increase the food intake of stunting toddler.

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Acceptance of High-Fiber Cookies among Children with Autism Spectrum Disorder

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Keywords: Autism · ASD · High fiber cookies · Acceptance
Background/Aims: Autism spectrum disorder (ASD) is a complex developmental disorder that can cause problems with cognitive ability, emotional stability, language skills, and response to the surrounding. Some children with ASD have been reported to be picky eater with most of them prefer cookies than fruit and vegetables. There have also been studies that reported high incidence of constipation among autistic children. This study aimed to determine acceptability of newly-formulated high fiber cookies (HFC; 6 g fiber per 100 g) compared to control cookies among ASD children. **Methods:** Acceptance level was tested using hedonic sensory evaluation. A total of 30 children with mild ASD and aged between 3 to 12 years old were recruited from an occupational clinic at the Faculty of Health Sciences, UKM. Hedonic sensory evaluation was found not to be suitable to be used with children with ASD, as they were not able to answer the questionnaire even with the help of their parents. Therefore, an observation (qualitative approach) was carried out at the clinic and their home. The acceptance of the cookies was based on the interest towards tasting the cookies and their facial expression after consuming the samples. **Results:** HFC was accepted by 63.3% of the respondents with 23.3% of them accepted both samples. About 73% of the participants responded positively to HFC both at the clinic and at home. **Conclusions:** High-fiber cookies were well accepted by the children with ASD. Thus, it could be an alternative snack to children with ASD to help alleviate their constipation problem.

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Fortification of Rice Noodles with Vitamin A: Quality, Sensory Evaluation, and Enhancement of Vitamin A Intakes

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Keywords: Rice noodles · Vitamin A fortification · Quality · Sensory evaluation · Intake
Background/Aims: Vitamin A deficiency is common in many countries where rice is the staple food. Food fortification is an important strategy to address this problem. As rice noodle is the second principal form of rice products widely consumed in Asia, rice noodles could be a potential vehicle for fortification of vitamin A. **Methods:** In this study, rice noodles were prepared from 0, 300, 600, 1050, and 1500 μg of vitamin A per 100 g of rice flour. Samples were analyzed for quality, sensory evaluation, and enhancement of vitamin A intakes. **Results:** Increasing level of vitamin A fortification did not influence quality and sensory properties of the rice noodles, except for the ash content, color, and appearance of the noodles. Rice noodles that was fortified with the highest level of vitamin A was found to be the darkest in color. However, this sample received scores higher than 6 (like slightly) for appearance. Furthermore, sample fortified with the highest level of vitamin A produced rice noodles with the highest level of vitamin A retention suggesting that noodles were good vehicle for vitamin A fortification. **Conclusions:** Fortification of rice flour with 1500 μg of vitamin A produced rice noodles with 24.88% of the RDI for vitamin A per serving and provided an effective means of enhancing vitamin A intake.

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Effect of Extraction Time on Characteristics of Nanocalcium Powder from Hen and Duck Eggshells

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Keywords: Nanocalcium · Hen · Duck · Egg shells · Extraction
Background/Aims: The objective of this research was to determine effect of extraction time on characteristics of nanocalcium powder from hen and duck eggshells. **Methods:** This research was conducted by using Factorial Completely Randomized Design with two factors and each treatment was replicated three times. The first factor was type of eggshell (hen and duck) and the second factor was extraction time (1, 1.5, and 2 h). Observed parameters were physical characteristics (yield and color), chemical characteristics (moisture content, ash content, calcium content, and crystal structure). **Results:** Type of eggshell had significant effect on yield,

color (lightness), and moisture content. Meanwhile, extraction time had significant effect on yield, color (chroma and hue), moisture content, and ash content. The best treatment was determined based on the highest yield and calcium content was nanocalcium powder from duck eggshell with 1.5 ho of extraction time. It gave yield of 15.27%, 94.03% lightness, 6.73% chroma, 28.87O hue, 0.156% moisture, 98.69% ash 27.38% calcium, and particle size of 19.48 nm. **Conclusions:** Nanocalcium powder from the eggshell of duck could be considered as an alternative material to improve calcium content of various food products.

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Survey on Patients' Need for Development of Smartphone Application for Colorectal Cancer Patients in Thailand: *Cancer Fighting*

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Keywords: Patient need · Survey · Colorectal cancer · Smartphone application

Background/Aims: Currently, one of the burden diseases in Thailand is Colorectal Cancer (CRC), which presented in top 3 of all types of cancer. Side effects of medical treatment could cause malnutrition due to inadequate calories and protein intake. Worse nutrition status could be resulted from nutrition knowledge deficiency. Thus, this study aimed to develop the nutrition-educational application prototype for smartphone, named *Cancer Fighting*. **Methods:** The survey was conducted from March to June 2018. A questionnaire was developed, proved by experts (registered dietitians and physicians), launched on Google Docs, and distributed in Thai Cancer group on several social platforms. A total of 110 of cancer patients and caregivers answered all three parts of the questionnaire: demographic session, patients' need and attitude, and basic knowledge related to nutrition therapy for cancer. **Results:** As much as 73.33% of the respondents lacked of knowledge on nutrition therapy for cancer therapy, thus there was a need to access reliable information as stated by 92.70% of them. Therapeutic menu for cancer patients was the most interesting topic for the respondents (13.07%). Furthermore, smartphone application was placed as the first priority for educational tool (60.90%) followed by personal counseling with dietitian (20.90%) and infographic tool (9.10%). **Conclusions:** *Cancer Fighting*, could be the first prototype for smartphone application for nutrition self-care for CRC patients in Thailand that provide valid scientific information and nutrition assessment, which were developed based on patients' need and suggestions. Moreover, it could be an alternative innovation to support Health Literacy (HL) in Thailand 4.0.

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Probiotic Nutrition to Advance Urogenital Health in Females: A Randomized Double-Blind Placebo Controlled Study

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Keywords: Probiotics · Urogenital · Health · Nutrition

Background/Aims: Recurrent Urogenital infections represent a global medical issue in the world, affecting millions of women because of dramatic shifts in bacterial composition and concentrations in response to numerous endogenous and exogenous factors. Urogenital microbiota forms a mutually beneficial relationship with their host and they have a major impact on health and diseases. This study aimed to compare probiotic therapy versus placebo in Oxidative Stress Values (OSVs) and histological features in urogenital infections in female patients. **Methods:** Forty patients diagnosed with recurrent urogenital infections were recruited to be treated as test group who received the probiotics for 90 days, while control group (n = 20) received placebo. Both groups were assessed for total oxidant capacity (d-ROMs test) and biological antioxidant potential as iron-reducing activity (BAP test) at baseline, after 1 and 3 months. Histological changes on inner vaginal mucosa were also investigated. **Results:** Total antioxidant capacity of the test group was significantly different, thus leading the general health conditions from the state on high oxidative stress to low oxidative stress. Increase of BAP values was more significant and they were clinically relevant in probiotic test group over time. **Conclusion:** Probiotic therapy could be an alternative therapy for patients with urogenital infections.

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Organoleptic Quality and Nutritional Value of Vegetarian Patty from Button Mushrooms

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Keywords: Burger · Button mushrooms · Patty · Vegetarian

Background/Aims: Button mushroom (*Agaricus bisporus*) contains 3.09 g protein and 0.34 g fat in 100 g of its wet weight, thus it has potential to be used as a meat substitute in production of burger patties that could contribute as source of protein for vegetarians. This study aimed to produce burger patty from button mushroom and evaluate its organoleptic quality and nutritional value. **Methods:** There were four patty formulations produced, where each formulation contained 500 g button mushrooms: A (with 100 g breadcrumb), B (with 80 g breadcrumb and 20 g cornstarch), C (with 60 g breadcrumb and 40 g steamed potatoes), and D (with 60 g breadcrumb, 20 g cornstarch, and 20 g steamed potatoes). The parameters tested were proximate composition and organoleptic test. The data collected were analyzed by ANOVA and continued with Duncan's New Multiple Range test at 5% level of

significance. **Results:** The four formulations contained significantly different nutrient composition (p < 0.05). On average, 100 g patty contained 160 kcal energy, 31 g carbohydrate, 6 g protein, and 2 g fat. In comparison to 100 g chicken patty (220 kcal), button mushroom patty contained lower calorie content. The organoleptic test showed significant differences in terms of taste, texture, and texture quality. The taste of sample D patty was different from A and B (p = 0.032), while texture of sample B was different from samples A, C, and D (p = 0.001) and texture of sample A was different from B, C, and D (p = 0.0001). **Conclusions:** Button mushroom patty could be produced as an alternative menu for vegetarian.

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Effect of Addition of Broiler Eggshell Flour on Calcium and Fiber Content of Yam (*Pachyrhizus rosus*) Biscuits

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Keywords: Biscuits · Egg shell · Yam

Background/Aims: Inadequate calcium intake during adolescence could cause less optimum peak bone mass , increasing the risk of osteoporosis in adulthood. Broiler eggshell is a food waste containing 97% calcium carbonate, which could be produced into flour that contains around 39% calcium. The broiler eggshell flour could be incorporated into production of biscuits made from yam flour. This research aimed to determine calcium and fiber content of yam biscuits with the addition of broiler eggshell flour. **Methods:** Four treatments were used in the experiment: addition of 0, 20, 40, dan 60 g of broiler eggshell flour in cookies formulation. Nutrients analyzed were calcium, crude fiber, and proximate composition. An organoleptic test using Visual Analog Scale with 20 semi-trained panelists was also conducted. The statistical analysis used for organoleptic test was One-Way ANOVA (95% CI) and continued with Duncan's Multiple Range test. For the data on nutrient analysis, they were analyzed with One-Way ANOVA (95% CI) and continued with Bonferroni test. **Results:** Sample with the best characteristics was F2, with 2.16 g water, 18.86 g ash, 56.58 g carbohydrate, 8.75 g protein, 13.44 g fat, 5358 mg calcium, and 0.3 g fiber per 100 g of sample. Furthermore, there was an effect of adding broiler eggshell flour on hedonic quality of texture (fineness) of the samples. **Conclusions:** Incorporation of broiler eggshell flour in yam biscuit could increase the nutritional value of the biscuits (water, ash, carbohydrate, protein, fat, calcium, and fiber).

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Soy Milk as a Post-Exercise Beverage to Reduce Blood Lactate Level and Increase VO2 max among Football Athletes

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Keywords: Soy · Milk · Recovery · VO2 max

Background/Aims: Many researchers suggested that chocolate milk (CM) could help with post-exercise recovery of athletes. Meanwhile, soy milk (SM) was recommended as an alternative to CM for athletes who are vegetarian or lactose intolerant, since its carbohydrate (CHO) and protein (P) content are similar to those of CM. Thus, it might offer similar recovery benefits as CM. This study compared the effect of SM and CM consumption on blood lactate (BL) level, beep test score, and VO2max of football athletes. **Methods:** The research subjects comprised of twenty male football athletes who were provided with the beverages (SM or CM) daily over a period of four weeks. The beverages were consumed at iso-volumic amount (600 mL) and matched color. The profile of SM sample was as follows: 450 kcal, 50.4 g CHO, 19.2 g P, while CM had 480 kcal, 66 g CHO, 15 g P. The experiment was conducted with single-blind randomized design, which was conducted after evening exercises. The beep test was conducted and evaluated before and after each treatment. As for BL level assessment, it was conducted before and after beep test. Data were analyzed using Independent T-test/Mann-Whitney and Paired T-test/Wilcoxon. **Results:** The level of BL was reduced after treatment eventhough no significantly decreased (p_{SM} = 0.111 P_{CM} = 0.061). Moreover, there was no significant differences between groups (ΔBL_{SM}: −2.18 ± 3.90 ΔBL_{CM}: −2.90 ± 4.29; p = 0.699). The BTS and VO2max were significantly increased at the end of treatments (p_{SM} = 0.007 P_{CM} = 0.001), yet there were no significant differences between group (ΔBTS_{SM}: 1.18 ± 1.07 ΔBTS_{CM} = 1.53 ± 1.01; p = 0.462) (ΔVO_2max_{SM}: 3.46 ± 3.12 ΔVO_2max_{CM} = 4.48 ± 2.97; p = 0.426). **Conclusions:** The effectiveness of SM is similar to that of CM as a recovery beverage.

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"Jakusa" Local Food Consumption Effort for Community in Kota Kendari

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Keywords: Jakusa – Corn – Sagu – Local food

Background/Aims: High dependency of rice among community. Corn and sago are the main staple food commonly subtitute rice has not been maximized the consumption. Hereafter, consumption of corn and sago are needed as local food for community in Kendari. This study aim to identify acceptability of Jakusa (Jagung Kuning dan Sagu) as a improvement efforts for local food consumption in Kota Kendari. **Methods:** This study is apra-eksperimental designwithrandomized group design, using 3prod-

uctsconsist of: corn (50%) + sago (50%), corn (75%) + sago (25%), corn (90%) + sago (10%). This study was done in all district at Kota Kendari with 270 panelist was randomly selected. Acceptability data obtained through Mann-Whitney test. While, nutrients in Jakusa was analysis in MIPA UHO Laboratory Kendariand cost calculation was done manually. **Results:** This study shows there is significant differences among colour, flavour and teksture from all products but there isn't for taste. Generally, all products was accepted by panelist (score for each products ≥ 3) but B consist of corn 75% and sago 25 is the most acceptance products with score 3.51. Storage ability products more than 1 year and has not been damage phisically or taste. Nutritional fact shows that notdifferent from all products except for protein and fat meanwhile cost production around threefold to fourfold compare rice.

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Development of Instant Pumpkin (*Cucurbita mochata*) Cream Soup as Suplementary Food For Elderly

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Keywords: Elderly · Pumpkin · Tempeh · Cream soup
Background/Aims: The elderly is vulnerable to nutritional problem. Recently, there had been few food products developed from local ingredients to improve nutritional status of the elderly. Pumpkin (*Cucurbita mochata*) and tempeh are local foods that have high nutritional content and they are commonly used for development of new food products in Indonesia. Cream soup is a processed that has soft texture and it could be easily digested by the elderly. The aims of this study were to produce instant cream soup pumpkin and tempeh and to analyze its sensory characteristics. **Methods:** This experiment used factorial randomized design. There were two products produced i.e. fresh cream soup (FC) and instant cream soup (IC) added with tempeh (0, 75, and 100%). Sensory evaluation performed with rating and ranking tests by semi-trained panelists. Nutritional content of the samples was analyzed using proximate analysis. Statistical analysis was performed with ANOVA and continued with LSD test for post-hoc analysis. **Results:** Processing method and addition of tempeh had different effect in sensory evaluation. Processing method had significant effect (p < 0.05) on viscosity, color, aroma, and texture, while addition of tempeh had significant effect (p > 0.05) on viscosity, aroma, taste, mouth feel, and overall acceptance. **Conclusions:** Production of instant cream soup from pumpkin and tempeh could be utilized as an alternative product for the elderly.

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Effect of Addition of Jackfruit (*Artocarpus heterrophylla* Lamk) Seeds on Nutritional Value and Sensory Acceptability of Mung Bean (*Vigna radiata*) Flakes

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Keywords: Jack fruit seed · Mung bean
Background/Aims: Low consumption of calcium may cause health problems in the bones, called osteopenia which is an early sign of osteoporosis. Jackfruit seeds are a source of calcium (33 mg/100 mg), which can be used to produce flakes by combining it with mung beans. This study aimed to determine the effect of addition of jackfruit seed flour on nutritional quality and sensory acceptability of mung beans flakes. **Methods:** The experiment was conducted with four formulations: F1 (100: 0), F2 (100: 40), F3 (100: 60), and F4 (100: 80). Calcium content and proximate composition of the samples were analyzed. Organoleptic test using isual Analog Scale was performed with 25 trained panelists. The statistical test was used was One-Way ANOVA (95% CI) followed by Bonferroni's test. **Results:** The sample F4 was considered as the most optimum formulation, with 52.21 mg calcium, 72.64 g carbohydrate, 15.88 g protein, 4.54 g fat, 4.11 g moisture, and 2.82 g ash per 100 g of sample. There was a significant effect (p < 0.05) from addition of jackfruit seed on the samples' crispness and smoothness that resulted in good acceptance in the samples' texture parameter. **Conclusions:** Increased addition of jackfruit seed flour could help increase the nutritional value of mung bean flakes, especially in terms of its calcium content.

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Nutrients of Concern and Nutrient Profiling of Selected Bakery Products

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Keywords: Trans fats · Sodium · Added sugar · Bakery products
Background/Aims: Bakery products are consumed widely across all age and income groups in India. However, there is no adequate data on the composition of the products. The current study aimed to analyze the composition (sugar, fatty acid profile, sodium) of selected bakery products. **Methods:** Bakery products that are frequently consumed by university students (18–25 years) were identified (n = 58) and analyzed for sodium (flame photometry), added sugar (DNSA method), fatty acid profile (GC, AOAC996.06). The products were categorized as high in fat, salt, and sugar using UK-FSA guidelines. **Results:** Of the 58 products assessed, 79% were high in added sugar (>12.5 g %). Majority of the products (74%) had medium sodium content (>120-<300 mg %), while 10% had high sodium content (>300 mg %). Thirty four percent of the products had high total fat (>20 g %), while 41% had

medium fat content (>3–<20 g %). Forty five percent of the products had trans fatty acids ranging from 2–14 g%. The predominant saturated fatty acid (SFA) in the samples was palmitic acid (80%) followed by arachidic acid (52%) and stearic acid (50%). The other prominent fatty acids were palmitoleic acid (MUFA), linoleic (PUFA), and linolelaidic acid (TFA). Of the total products containing trans fatty acids, 36% were high in trans fats (>1% of total energy/100 g). All the products were categorized as "less healthy" by nutrient profiling score. Twenty-nine percent of the products were high in two nutrients of concern, namely fat and sugar or sugar and saturated fats. **Conclusions:** There is a need to incorporate healthy processing of bakery products in order to provide products with healthier nutrient profile for the market.

Microencapsulation of Bone Marrow from Bali Cattles by Spray Drying as Functional Food to Support Fetal Growth during Pregnancy

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Keywords: Bone marrow · Fetal growth · Microencapsulation · Spray drying

Background/Aims: Intrauterine Growth Retardation (IUGR) refers to poor growth and development of fetus during pregnancy. Failure in growth could result in infants with low birth weight who then grow up as stunted children under five. Children with stunting are more susceptible to chronic diseases in adulthood. This study aimed to develop bone marrow microcapsules from Bali cattle as functional food for supporting fetal growth during pregnancy. **Methods:** Microencapsulation of bone marrow used combination of two coating materials: maltodextrin (MD) and gum arabic (GA). Spray drying technique was used to encapsulate the bone marrow. The samples' characteristics such as nutrient content, encapsulation efficiency, and particle size were investigated. **Results:** The blend of MD:GA in a ratio of 50:50 gave highest encapsulation efficiency. As percentage of maltodextrin in the coating material was increased, the properties of encapsulated material were affected. **Conclusions:** Microcapsules of bone marrow from Bali cattle could be added into various foods and beverages to assist prevention of IUGR during pregnancy.

Fortification of Coconut Sugar with Cricket (*Gryllidae sp*.) Protein as an Alternative Solution for Chronic Energy Malnutrition in Pregnant Women

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Keywords: Fortification · *Gryllidae sp* · Coconut sugar · CEM

Background/Aims: Chronic energy malnutrition (CEM) is a nutrition problem that often occurs in pregnant women. This condition is caused by deficiency of calorie and protein intake in long term. It can cause bad impact on the health of both, the mother and the fetus. This research aimed to determine effect of fortification of cricket (*Gryllidae sp.*) with brown sugar as an alternative solution for CEM in pregnant women. **Methods:** An experiment was conducted to develop a fortified product by drying the cricket and granulating it as fortificant. The cricket granules were then crystallized with coconut water with a ratio of coconut water: cricket granules at 8:2. Nutrition content was calculated based on food composition database. **Results:** In 100 g of coconut sugar fortified with cricket, it contained 336.84 kcal, 54.2 g carbohydrate, 19.8 g protein, and 9.6 g fat. Based on calculation, an appropriate serving size of coconut sugar with cricket for pregnant women in the first trimester I was 10 g, whereas for those in the second and third semester was 15 g. Consumption of this serving size was calculated to be able to supply nutrients by 10–21% of the required amounts. **Conclusions:** Coconut sugar fortified with cricket granules could be used as an alternative solution for CEM in pregnant woman. Further laboratory analysis is necessary to determine the actual nutrient content of the product.

Characterization of Chemical Composition and Antioxidant Properties of *Ampiang* (Glutinous Rice Flakes): A Traditional Food Product from West Sumatera, Indonesia

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Keywords: Ampiang · Glutinous rice flakes · Antioxidant properties · Pigmented glutinous rice · Non-pigmented glutinous rice

Background/Aims: *Ampiang* is a local food product from West Sumatra, Indonesia. It is made traditionally from glutinous rice,

which is gelatinized and then flattened. In addition to being rich in starch, fat, protein, vitamins, and minerals, *ampiang* contains rice bran that is rich in bioactive components, such as dietary fiber, phenolic components, γ-oryzanol, ferulic acid, phytic acid, cafeic acid, tricine, cumarate acid, tocopherol, tocotrienols, phytosterols, and carotenoids. These components have been reported to have antioxidant activity. The aim of this study was to investigate the chemical characteristics and antioxidant properties of pigmented and non-pigmented glutinous rice flakes (*ampiang*) made by traditional processing. **Methods:** Three types of glutinous rice were used in the experiment: white glutinous rice, red glutinous rice, and black glutinous rice. The production stages of *ampiang* are soaking, followed by roasting and flaking, where the flakes formed still contained rice bran. **Results:** *Ampiang* made from black glutinous rice had higher content of ash, protein, dietary fiber, total phenolic, total flavonoid, and anthocyanin than the other *ampiang* samples. With higher phenolic, flavonoid, and anthocyanin content, black *ampiang* consequently had higher antioxidant activity than the white and red *ampiang*. White ampiang was found to have the highest fat, carbohydrate, and amylose content. Furthermore, amino acid and fatty acid composition of the samples were also determined. **Conclusions:** Utilization of black, red, and white glutinous rice to be *ampiang* could produce products with good chemical characteristics and antioxidant properties

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Development of a Photographic Food Atlas as a Portion Size Estimation Kit for Malaysian

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Keywords: Portion size estimation · Food atlas · Dietary assessment

Background/Aims: Photographic food atlas has been used to quantify food portion size in dietary assessment. The existing food atlas in Malaysia emphasizes on standard food exchange and therefore, it may not represent the range of portion sizes consumed by the local population. This study described evidence-based development of a photographic food atlas, namely MY Food Album, as a portion size estimation kit for Malaysian. **Methods:** In a laboratory setting, 34 respondents (mean age = 31.6 ± 20.9 years) self-served themselves with 23 amorphous food to represent their small, medium, large and typical portion sizes. All food portions were weighed to obtain mean and standard deviation that represented the range of food portion size to be displayed in the atlas. Pictures of various common foods (amorphous and non-amorphous) were photographed at 45° angled view using standard camera and lighting settings. **Results:** MY Food Album contained a total of 393 food items from 14 food groups that were presented as serial (n = 102), guide (n = 212), and range (n = 79) photographs. A total of 23 amorphous foods were presented as a series of four to eight photographs of increasing portion sizes with weight difference between −1.5 and 2.5 standard deviations from average portion sizes observed in the laboratory. The smallest photograph size was 78x51 mm that could be displayed together as eight images on one A4 page. **Conclusions:** MY Food Album

is a set of food photograph series representing portion sizes typically consumed by Malaysians. Validation is needed to evaluate the effectiveness of using this newly developed food atlas on portion size estimation.

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Effect of Pre-Exercise Carbohydrate Feeding on Trampoline Athletes Time of Flight and Body Movement at Horizontal Direction

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Keywords: Carbohydrate · Trampoline · Time of flight · Body movement at horizontal direction · Central nervous system

Background/Aims: The objective of this study was to determine the effect of pre-exercise carbohydrate feeding on time of flight and horizontal body movement among trampoline athletes. **Methods:** Firstly, the subjects completed one set of exercise in fasting state that was recorded and another set in 30 min after ingestion of carbohydrate. Their time of flight was recorded and their plasma glucose and lactate concentrations were taken before the exercise, soon after the exercise, and 3 min after the exercise. Based on the analysis of the video record, positions of the athletes' feet, bellies, and hips should also be recorded. The subjects' EEG data was collected in the fasting state and 30 min after the ingestion of carbohydrate. **Results:** After the ingestion of carbohydrate, the total time of flight was increased (p = 0.034). Meanwhile, plasma glucose concentration before the exercise was higher than the one soon after the exercise and 3 min after the exercise (p = 0.00). Moreover, the plasma glucose concentration taken at 3 min after the exercise fell compared with the one soon after the exercise (p = 0.001). After the ingestion of carbohydrate, there were no differences in terms of lactate concentration among the three tests, while dispersion was improved during the sets (p = 0.005). The level of adrenaline activation in the left frontal region of the brain was higher (p = 0.037) after carbohydrate ingestion, while activation of acetylcholine was lower (p = 0.045). Furthermore, excitatory transmitter activation in the left occipital region was lower compared with the ones before the intervention (p = 0.03). **Conclusions:** Pre-exercise carbohydrate feeding could help increase the time of flight among trampoline athletes.

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Effect of Wheat Peptides on Ethanol-Induced Gastric Mucosal Damage in Rats

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Keywords: Gastric mucosal damage · Ethanol · Wheat peptides

Background/Aims: Excessive alcohol consumption can lead to gastric mucosal damage and the present work was aimed to examine protective effect of wheat peptides on model of ethanol-in-

duced gastric mucosal damage in rats. **Methods:** Wheat peptides (83, 167, and 333 mg/kg), cimetidine (65 mg/kg), or distilled water were administered daily by gavage for 30 days before the rats were treated with anhydrous ethanol (1 mL) and then euthanized 1 h after ethanol ingestion. **Results:** Histological observation showed that ethanol-induced gastric mucosal damage was attenuated by pretreatment with wheat peptides. Wheat peptides remarkably increased the superoxide dismutase (SOD) activity, epidermal growth factor (EGF), and prostaglandin E-2 (PGE2) levels in serum. Treatment with wheat peptides dramatically decreased the malondialdehyde (MDA), platelet-activating factor (PAF), and interleukin-8 (IL-8) levels in serum. Expression of caspase 3 was significantly decreased in rats treated with wheat peptides than those in the model group. In addition, wheat peptides pretreatment markedly increased the expression level of EGFR. **Conclusions:** Ethanol-induced gastric mucosal damage in rats could be prevented by wheat peptides. The potential mechanism may be associated with enhancement of antioxidant, anti-inflammatory, and anti-apoptosis functions.

Fortification of Yellow Alkaline Noodles with Wheat Bran and The Impact on Physical and Sensory Properties

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Keywords: Yellow alkaline noodles · Wheat bran · Dietary fiber · Food product properties
Background/Aims: Food fortification is a commonly-used method to increase nutritional value of food products in order to reduce the risks of Non-Communicable Diseases (NCDs) caused by poor diet and inadequate intake of essential nutrients. Noodles are a versatile and popular staple food, especially in Asia, that can be nutritionally enriched using various types of ingredients. This study aimed to determine effect of fortification of fresh yellow alkaline noodles with wheat bran on its physical and sensory properties. Wheat bran was selected due to its rich content of dietary fiber. **Methods:** Addition of wheat bran was varied in concentration (0–20%) and physical properties of fortified yellow alkaline noodles were assessed. Additionally, 9-point hedonic scale and 'Just About Right' scale were employed to assess sensory properties of the fortified noodles, using 40 non-trained panelists. **Results:** Noodles fortified with the highest amount of wheat bran exhibited the highest cooking loss (4.61%) compared to the non-fortified one (2.78%), indicating weak structural integrity, presumably due to the impaired gluten network. On contrary, noodles fortified with various amount of wheat bran did not demonstrate significant alteration of textural properties in terms of springiness, cohesiveness, and resilience. In general, noodles fortified with 10% of wheat bran had the highest preference among the panelist based on general appearance, overall acceptability, color suitability, hardness suitability, and smoothness. Furthermore, proximate analysis showed noodles supplemented with 10% of wheat bran met regulatory criteria for claim as a high-fiber food, with its dietary fiber

content of 5.40 g/100 g of noodles. **Conclusions:** Fortification of alkaline yellow noodles with wheat bran could improve its nutrient profile, physical properties, and sensory characteristics.

Practice and Evaluation of Community Cooking Classes for Food Allergy: Alternative Meals without Eggs, Milk, and Wheat

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Keywords: Food allergy · Allergens · Cooking · Alternative meal
Background/Aims: The prevalence of food allergy (FA) in Japan is 5–10% for infants and 4.6% for school children. The main allergens known are eggs, milk, and wheat. In order to maintain QOL for FA children, it is necessary to ensure appropriate nutrients while removing allergens. This study aimed to determine effect of cooking classes held by nutrition students who held cooking classes in the community, that can benefit FA children to lead a safe, healthy, and enjoyable life **Methods:** Cooking classes for FA were held twice in Fukushima City from 2017 to 2018. Participants were elementary school students and their families. A questionnaire-based survey was conducted after the class. Fifteen families, including five FA patients, participated. The menu was cold Chinese noodles, ice cream, omelet rice, and sponge cake. Instead of eggs, pumpkin, rice flour, cornstarch, and banana were used. While instead of wheat, corn noodles, rice flour, and cornstarch were utilized. Soymilk, tofu, and oil were used to replace dairy milk. **Results:** In the survey, all children answered that the food provided was "delicious" and 93% of them answered the class was "fun". All of the parents answered they were "very satisfied", with various reasons for participation such as: "I never ate omelet rice because of FA" "To teach my friends" "I plan to give birth". Parents commented: "It is wonderful to eat together as a family without restraints". **Conclusions:** The needs of cooking classes for FA are high. Thus, it is suggested to increase opportunities for families and friends, not only patients but also supporters.

Development of Snack Bar from Edamame and Pumpkin Seed as Healthy Snack for Teenagers

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Keywords: Edamame · Pumpkin seed · Snack bar · Teenager
Background/Aims: Indonesia is going through increasing trend of obesity, including among teenage population. This phenomenon could be attributed to unhealthy dietary pattern and sed-

entary lifestyle. Unhealthy diet is often supported by marketing of snack and junk food that contain high calorie, but low dietary fiber and micronutrients. Hence, development of convenient food products such as snack bar is important to provide healthier choices of food for teenagers. Edamame and pumpkin seed contain high dietary fiber and unsaturated fatty acids; thus, they have great potential to be developed into snack bar. The objective of this research was to develop snack bar from damame and pumpkin seed as an alternative for healthy snack. **Methods:** The product was developed and followed by sensory acceptance test. **Results:** The selected sample had the highest scores for color and aroma attributes (4.7 out of 5), while its score for texture was slightly lower (3.4). In terms of overall acceptance, the sample was scored 3.81, which showed that it was relatively well accepted by the panelists. The energy, protein, fat, and fiber content per 100 g of the sample was estimated to be 435 kkal, 11.8 g, 15.6 g, and 7.9 g, respectively. **Conclusions:**

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Development of Instant Powder Formula with Addition of *Moringa oleifera* as a Complementary Food for Infants Aged 6–12 Months

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Keywords: Instant · *Moringa* · Infants

Background/Aims: Infants aged 6 months onwards need complementary foods that meet their nutritional requirements. This study aimed to produce instant powder formula with addition of *Moringa oleifera* leaf as a complementary food for infants aged 6–12 months. **Methods:** The experiment used Completely Randomized Design and determination of the selected formula was conducted using Solver program in Microsoft Excel 2007. All ingredients were homogenized with dry mixer. Effectiveness index method was used to determine the best formulation. **Results:** The sample that gained the best score (0.697) was composed of 72 g red rice flour, 8 g Moringa leaf flour, 15 g soybean sprout flour, and 5 g sugar flour. In terms of its nutrient content, the selected formula contained 361.1 kcal energy, 22.6 g protein, 4.3 g fat, 58.2 g carbohydrate, 2.9 g moisture, and 2.9 g fiber. While for its physical characteristics, it had 0.61 bulk density, and 1:1.5 water absorption, and the panelists gave it an acceptance score of 2.6 out of 5.0. **Conclusions:** Instant formula with addition of *Moringa oleifera* leaf powder successfully met the nutritional requirements of infants in terms of energy, protein, moisture, and fiber content, along with good physical characteristics and relatively well-accepted sensory characteristics.

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Rice Protein Suppresses Inflammation in Adult Rats via NF-κB Pathway

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Keywords: Rice protein · Inflammation · NF-κB pathway · Adult rats

Background/Aims: Rice protein is a major plant protein widely consumed in the world. The major aim of this study was to determine the effect of rice protein on suppressing inflammation in adult rats. **Methods:** Two groups of adult male Wistar rats were respectively fed with casein and rice protein, with dietary protein level of 14% (as crude protein, CP) for 2 weeks. Each group consisted of six animals. The mRNA levels and protein expressions of nuclear factor kappa B (NF-κB), nuclear factor-κB inhibitor alpha (IκBα), interleukin 1-beta (IL-1β), interleukin 6 (IL-6), tumor necrosis factor alpha (TNF-α), and interleukin 10 (IL-10) were measured. Differences between groups were examined for statistical significance using One-Way ANOVA followed by the least significant difference test. The criterion for significance was $p < 0.05$. **Results:** Compared to casein, rice protein could increase levels of nuclear factor-κB inhibitor alpha (IκBα) ($p < 0.05$) and interleukin 10 (IL-10) ($p < 0.05$) in adult rats. With intake of rice protein, mRNA levels and expressions of nuclear factor kappa B (NF-κB) ($p < 0.05$), interleukin 1-beta (IL-1β) ($p < 0.05$), interleukin 6 (IL-6) ($p < 0.05$), and tumor necrosis factor alpha (TNF-α) ($p < 0.05$) were suppressed in adult rats after 2 weeks of feeding. **Conclusions:** Rice protein could suppress inflammation in adult rats via NF-κB pathway.

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Formulation of Crackers With Substitution of Sweet Potato Flours, Kelor Leaves and Cohi Fish as Potential Foods for Pregnant Anemia Women

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Keywords: Crakers – Sweet potatoes – Moringa leaves – Cohi fish – Pregnant women

Background/Aims: Efforts to improve nutrition for anemic pregnant women can be done through the provision of nutritionally enriched food with the use of local food sources. This study aims to make crackers with the substitution of sweet potato flour, Moringa leaf flour and Cohi Fish flour, as a nutrient-rich food for anemic pregnant women. **Methods:** Crackers are formulated with 3 variations of the mixture of ingredients, namely the ratio of sweet potato flour, Moringa leaf flour and Cohi Fish meal: F1 crackers (15%: 5%: 10%); F2 crackers (15%, 10%, 5%) and F3 crackers (10%: 10%: 10%), while wheat flour is 70% each. Receipt of crackers was analyzed by organoleptic tests for taste, aroma, color and texture by 20 semi-trained panelists, namely students with three favorite levels like score 3, less like score 2 and disliking score 1. Crackers most preferred were analyzed for protein, iron , zinc and vitamin

A. **Results:** The results showed that the F2 crackers formula was most preferred organoleptically. Furthermore, the results of nutrient analysis showed that in 100 g crackers there were 14.6 g of protein, 63.8 g of Fe, 20.6 g of Zn and 11,596.7 µg of Vitamin A. This formula can be given to pregnant women as much as 30 g per day to meet the needs of Fe around 50%.

Poster Presentation

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Emo-Demo: Combining Science and Innovation for Community-Based Child Feeding Interventions in East Java, Indonesia

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Keywords: Emo-demo · Children under two · GAIN · *Posyandu*
Background/Aims: GAIN piloted emotive, interactive, and surprising ways of improving infant and child feeding in the form of 'emotional demonstrations' or emo-demos. This study aimed to assess the effectiveness of emo-demo approaches in improving the quality of infant and young children feeding including breastfeeding. **Methods:** A cluster randomized controlled trial (cRCT) was conducted in 12 sub-districts in Malang and Sidoarjo. The emo-demo sessions were inserted within the existing integrated health post (*Posyandu*) activities and antenatal classes between 2015 and 2017. The outcome of the intervention was assessed by repeated cross-sectional surveys. A total of 2,435 caregivers who took care of children under two completed the interviews initially, while 2 years later, the number went to 2,740 caregivers. **Results:** Approximately 45% of the intervention group and less than 1% of the comparison group had attended an emo-demo session 3 months priors to the survey (p < 0.000). Children who were taken care by the caregivers from the intervention group were significantly more likely to achieve a minimum dietary diversity score of ≥4 food groups (OR = 1.69 [95% CI: 1.2–2.39], p = 0.003) and consume iron-rich foods (OR = 1.66 [95% CI: 1.14–2.42], p = 0.008). The emo-demo sessions also significantly improved complementary feeding practices. **Conclusions:** GAIN is currently working with the Ministry of Health and local universities to improve and expand the content of the emo-demos and scale-up this intervention through *Posyandu*.

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Wellness and Nutrition Organizations: Women Leadership and New Paradigms

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Keywords: Women leaders · Wellness · Nutrition · Leadership development
Background/Aims: Women leadership is a force to reckon with. Asia, more than any other regions, has had the highest number of female heads of state. The feminine drive to affiliate with others unifies the eight factors (powerful motivation driven by a sense of meaning, capacity for risk-taking, ability to focus intelligence, ability to find great problems to work on, willingness to compete in hierarchies, ability to tolerate and learn from failure, significant skill to deal with difficult people, and development of autonomy and power) that determine whether women will attain positions of power. The study aimed to describe the profile of eleven, from the sixteen women leaders in nutrition and wellness, in terms of their leadership definition and characteristics, skills, and styles of leadership as leader of the accredited professional organization of nutritionist-dietitians in the Philippines. **Methods:** KII was used to determine their dominant characteristics, skills and strategies for leading change or managing change and to identify the type of new paradigms they could share to meet the challenges of local and global practice. Validation of interview with documentary analysis using existing annual reports, newsletters, and publications was also performed. **Results:** The study showed that inner qualities and strengths to lead with conviction is a priority manifestation of unique personal power, purpose, and vision in order to meet the challenges of local and global practice as well as to adhere to lifelong learning. **Conclusions:** The anchoring point of the majority of the female leaders was a discovery for leadership development model.

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The Effect of Nutrition Education on School-Aged Children's Consumption Pattern, Knowledge and Practice in Bringing Well-Balanced Menu for Lunch

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Keywords: Balanced nutrition · Nutrition education
Background/Aims: This study aimed to analyze the effect of nutrition education on the consumption pattern, knowledge, and practice in bringing a well-balanced menu (WBM) for lunch among school-aged children. **Methods:** The study was a quasi-experimental research using one group with pre- and post-tests. Subjects were 52 students in fifth grade at SDN Babakan Dramaga 04, Bogor. The study was conducted from February to April 2017 and nutrition education was provided twice in 2 weeks. The first post-test for nutritional knowledge was done 1 week after the nutrition education, while the evaluation of the practice of bringing

WBM for lunch was conducted 2 weeks after the intervention. The second and third post-tests were performed every 2 weeks after that. **Results:** The knowledge on balanced nutrition increased after the intervention. The initial nutritional knowledge was significantly different with those of the first and second post-tests with p values of 0.003 and 0.01, respectively. Subjects showed an improvement in the practice of bringing a well-balanced menu for lunch after the nutrition education intervention. It was also shown that carbohydrate intake at the third post-test was related to nutritional status after the intervention. **Conclusions:** The practice of bringing WBM for lunch should be continued students and monitored by physical education teachers. Parents, especially mothers, should support their children by providing balanced and nutritious food at home.

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Complementary Food Based on Rice Flour (*Oryza sativa*), Anchovy (*Stolephorus sp*), and Tempeh

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Keywords: Breastfeeding · Complementary food · Mothers · Nutrition

Background/Aims: Complementary food starts to be provided for breastfed babies after they are 6 months old. This study aimed to develop complementary food with good acceptability for infants aged 7–11 months old. **Methods:** The study used a completely randomized design with 3 treatments and 2 replications. The raw materials formula consisted of fresh anchovy, tempeh, rice flour, shallots, garlic, and water. There were three formulations with different ratios between fresh anchovy and tempeh: F1 (24.2%: 8.1%), F2 (16.1%: 16.1%), and F3 (8.1%: 24.2 %). Hedonic test was performed on samples to evaluate their color, flavor, taste, and texture. **Results:** The hedonic test showed no significance differences among samples (p > 0.05) for their sensory likeness. Among the three formulations, F2 was considered having better nutritional characteristics with 10.2 g of water; 2.2 g of fat; 6.6 g of protein; 78.8 g carbohydrates, and 362 kcal energy per 100 g of sample. The selected sample could also contribute 49.9 % of energy need for infants aged 7–11 months old. **Conclusions:** Although it had relatively good sensory acceptance, the nutritional profile of the samples could not met the requirements issued by the Ministry of Health yet. Thus, further study has to be conducted.

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The Effect of Food Diary on Total Cholesterol and Adherence to Healthy, Balanced Diet among Teachers at Santo Yakobus High School, North Jakarta

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Keywords: School teachers · Nutrition education · Food diary · Balanced diet · Total cholesterol

Background/Aims: There is a high prevalence of hypercholesterolemia in Indonesia. Education on the 4 pillars of healthy, balanced diet is important as both curative and preventive efforts for people with hypercholesterolemia. One of the tools used in nutrition education is food diary. The purpose of this study was to analyze the influence of food diary on the practice of taking healthy, balanced diet and total cholesterol level among high school teachers. **Methods:** This study used the One Group Pretest-Posttest Design with the Activated Health Education model. Data collection was carried out from a total of 40 subjects. The study was conducted at Santo Yakobus High School at Kelapa Gading district in North Jakarta, from July to August 2018. Throughout the research process, there were 10 persons excluded. The instruments used were Semi-Quantitative Food Frequency Questionnaire, food diary, and cholesterol test device. Statistical analysis was performed with paired t-test and Pearson's correlation test with 95% confidence interval. **Results:** The results showed the prevalence of high total cholesterol and lack of adherence to balanced diet among subjects. There was a significant change in adherence to balanced diet (p ≤ 0.05), however the correlation between the adherence and total cholesterol level was not significant (p > 0.05; r = 0.180). **Conclusions:** Schoolteachers should improve adherence to healthy, balanced diet through nutrition education programs in the school.

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Impact of Inulin, Fructooligosaccharide and Lactobacillus Acidophilus on Polycystic Ovarian Syndrome (PCOS)

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Keywords: Syndrome – Infertility – Dietary – Prebiotics – Probiotic – Estradiol valerate

Background/Aims: Prebiotics and probiotics have the potential to be an appropriate treatment of polycystic ovarian syndrome (PCOS) as they target pathological consequences in this syndrome. **Methods:** Present study of 16 weeks was carried out to investigate potential effects of prebiotics and probiotic on 45 female Wistar rats. Rats were randomly allotted in 5 groups (9 rats/group) and names to diets viz., NC (Negative Control), PC (Positive control), I5 (inulin 5% w/w), F5 (fructooligosaccharide 5% w/w) and L1 (1

% *Lactobacillus acidophilus* w/w about 1×1010 CFU/g). All rats were PCOS induced except NC group. Animals were offered water and feed ad labitum. Body weights and blood glucose were recorded weekly. At the end of experiment rats were sacrificed to collect blood samples for analyzing lipid profile. **Results:** At 7th week of trial the dietary treatments significantly ($P < 0.05$) reduced the body weight in rats than PC fed diets rats. After 5th week there was significant ($P < 0.05$) decrease in blood glucose levels of rats fed F5, I5 and L1 diets than those rats fed PC diet.Lipid profile, cholesterol, triglyceride and low-density lipoproteins were lowered ($P < 0.05$) in PCOS rats fed F5, I5 and L1 diets. However, the highest increase in high density lipoproteins ($39.01 \pm 1.30b$) was noticed in animals fed L1 diet. **Conclusions:** In conclusion, the findings of current experimental study suggested that prebiotics and probiotic in treated diets had effective role in reducing body weight, blood glucose as well as improving lipid profile, so they might be a novel approach to treat symptoms of PCOS.

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The Effectiveness of Community-Based Management for Severe Acute Malnutrition (CMAM) Program in the Working Area of Oelbiteno Primary Health Center, Central Fatuleu Sub-District, Kupang

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Keywords: Community Base Management for Severe Acute Malnutrition (CMAM) · Input · Process · Output

Background/Aims: The Community-based Management for Severe Acute Malnutrition (CMAM) Program is a trial program or pilot project targeting children aged 6–59 months with poor nutrition status without health complications. The program stresses on the concept of community nurse to identify cases using LILA ribbon targeting method. This research aimed to explore the CMAM program based on the system analysis i.e. input, process, and output. **Methods:** This research was conducted from January to October 2018 in Oelbiteno Primary Health Center (PHC), Central Fatuleu sub-district with seven respondents in total. The key respondent was a nutritionist the PHC, with supporting respondents consisted of a head of integrated health post, a cadre of the integrated health post, and four parents selected by snowball sampling technic. **Results:** There was a shortage of trained staff and infrastructure at the input variable; while social support for outpatient care was already available. For the process variable, identification of health cases by the community had not been implemented. However, the output of the CMAM program was considered effective as 96.78% children under five in the area reached the targeted body weight. **Conclusions:** In order to ensure effectiveness of CMAM program, parents should regularly attend the program and the community needs to provide support for outpatients as well as identify health cases using LILA ribbon screening. The public health center and local government of the Oelbiteno sub-district should coordinate their works effectively in providing the required infrastructure needed for providing adequate health service for the community.

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Intake of High Nutrition Moon Shell Using Vacuum Cooking

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Keywords: Moon shell · Sensory evaluation · Vacuum cooking · Japanese rice wine · *Sake*

Background/Aims: Moon shell inhabits the Japanese coast concurrently with the breeding season of clams, so it is often regarded as the natural enemy of clams. Moon shell has high protein content and it contains various minerals, such as zinc and potassium. However, it is less preferred due to its stickiness, foul odor, and tough meat. Therefore, the purpose of this study was to develop a formulation to improve the texture and taste of moon shell and to find suitable cooking method for moon shell. **Methods:** Samples of moon shell were provided by Aichi Prefectural Fisheries Examination Center. Five heating methods were used: boiling, steaming, pressure cooking, microwave cooking, and vacuum cooking using water, Japanese rice wine (*sake*), and Japanese tea as heating medium. The breaking stress was measured using creepmeter and the physical property was assessed using scanning electron microscope (SEM). Color of the sample was analyzed using a colorimeter, while mineral content (Na, K, Mg, and Ca) were analyzed by Ion-Exchange Chromatography. A sensory evaluation was performed with 41 untrained panelists to assess color, taste, flavor, texture, and overall acceptance of the samples. Data collected were analyzed with t-test. **Results:** Moon shell has particularly high K, Mg, and Ca. Heating of moon shells using vacuum cooking resulted in smooth tissues without cracks. In terms of sensory evaluation, cooking using sakeyielded the most preferred and accepted samples in terms of appearance and texture. Furthermore, microwave cooking and vacuum cooking helped to improve the edibility of the samples. **Conclusions:** Moon shell has relatively good mineral content profile and in order to improve its edibility, cooking by wet heating methods is suitable to be used.

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Resilient Elderly, an Option to Maintain Nutritional Status and Cognitive Function among the Elderly

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Keywords: Resilient elderly · Nutrition status · Cognitive function

Background/Aims: Increased life expectancy of Indonesian has consequently raised the number of elderly in the population. Various problems of malnutrition and cognitive impairment in the elderly need to be addressed properly, so that they can at least maintain their nutritional status and cognitive function. Data collected from Tiudan District Health Office showed that there

were 37.1% malnourished elderly and 34.9% of them experienced cognitive impairment. The district health center routinely conducted activities for the elderly named as "Resilient Elderly", which aimed to maintain nutritional status and cognitive function of the elderly with activities such as Elderly Cheerful Exercise, Elderly Nutrition Huts, Elderly Nutrition Ambassador, Elderly Nutrition Storytelling, and monthly home visits to monitor their nutritional status and cognitive function. **Methods:** The target of this activity was elderly who participated in the elderly program at the local Integrated Health Post (*Posyandu*) conducted by the Tiudan Primary Health Center. This study involved 1312 elderly as the respondents. **Results:** The program that had been carried out for 14 months was shown able to improve the nutritional status of the elderly, where the number of malnourished elderly decreased by 1.2% to 35.9% with a decrease in cognitive impairment by 0.6% to 34.3%. **Conclusions:** The program "Resilient Elderly" could be used as an alternative activity to improve nutritional status and cognitive function among the elderly.

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Adoption of Kalinga Supplementary Mix as Nutrition Intervention Program: The Case of Bidani Areas in Nagcarlan, Laguna, Philippines

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Keywords: BIDANI · Nutrition intervention · Supplementary mix · Adoption · Sustainability
Background/Aims: The Barangay Integrated Development Approach for Nutrition Improvement (BIDANI) is a participatory and integrated development approach that was developed to address malnutrition in the Philippines rural villages. Using BIDANI, traditional nutrition interventions are introduced into communities based on recognized needs and implemented as part of local development plans that is anchored on community-based leadership and resources. The BIDANI experience indicated feasibility, acceptance, and better outcomes when nutrition interventions are integrated into all aspects of family and community life. This paper presents the processes and elements to successful dissemination of a supplementary mix called KALINGA as a community nutrition intervention/technology, including the facilitating and limiting factors that affected program implementation, and the contributions of the intervention to community development. **Methods:** Data were collected through focus group discussions, key informant interviews, and participatory observation. **Results:** Shared responsibility of the government, communities, families, and individuals, as well as the roles of the extension worker/public service agent in the different phases of the project is highly essential in the adoption, sustainability, and impact of the nutrition interventions. This innovative process can also be adopted and replicated to other areas for a more sustainable nutrition-cum livelihood intervention for fam-

ily and community development. **Conclusions:** The adoption of KALINGA especially for its nutritional benefits can be considered for further researches.

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Green Jackfruit as High Dietary Fiber Meat Substitute in Vegan Thai Fishcake

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Keywords: Jackfruit · Fishcake · Meat substitute · Health benefit · Dietary fiber
Background/Aims: Jackfruit (*Artocarpus heterophyllus Lam.*) is an indigenous plant widely grown in tropical areas. Green, immature (1–3 months old) jackfruit has been used as meat substitute in traditional recipes throughout Asia because of its meat-like texture. Moreover, green jackfruits are high in dietary fiber, vitamin C, potassium, as well as phytonutrients, which have potential health benefits. This study aimed to determine the physico-chemical properties, sensory quality, and nutritional qualities of vegan Thai fishcakes (VFC) made with green jackfruit as the meat substitute. **Methods:** Boiled green jackfruit flesh, containing 91% moisture, 3% dietary fiber, and 2% protein, was either diced, shredded, or mashed before mixing with other ingredients to substitute minced fish in fishcake formulation. The batter was then cooked by deep-frying using palm oil. **Results:** Hardness, springiness, cohesiveness and chewiness of VFC samples were significantly lower than original fishcake ($p < 0.05$), but the color values (L*, a*, b*) were similar. Sensory evaluation using 9-point hedonic scale indicated that VFC made with mashed green jackfruit was the most accepted sample as compared to other VFC and was not different from the original fishcake recipe. Dietary fiber content of VFC was 9.4 g/100 g or 7.5 g/serving (80 g), which was two times higher than the original fishcake. The developed VFC thus could be considered as a good source of dietary fiber, although its protein content (2.2 g/100 g) was lower than the original fishcake whose protein content was 14 g/100 g. **Conclusions:** Therefore, green jackfruit could be used as high dietary fiber meat substitute in producing vegan Thai fishcake.

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Alternative Strategy for Food Diversification in Papua through Provision of Nutritious Instant *Papeda*

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Keywords: Instantization · Sago · Papua · Papeda
Background/Aims: Sago is a potential carbohydrate source grown well in Papua. However, Papua suffers a high prevalence of

undernutrition and energy intake inadequacy due to lack of food accessibility, nutrition intake and consumption pattern. This paper aimed to suggest a concept to introduce value-added traditional sago-based food called Nutritious Instant *Papeda* (NIP). *Papeda* is mainly composed of carbohydrate but it is lack of major nutrients, especially protein, and it has low fiber and energy. The NIP was designed as ready-to-cook alternative staple food in Papua by using local sago as the main ingredient and it was produced in instant form as dry powder in order to prolong its shelf-life. **Methods:** NIP was processed by instantization of sago flour and drying of fish and vegetables into flakes. It was composed of pre-gelatinized sago starch, *cakalang* and *tongkol* fish, and cassava leaves. Sago starch was roasted and then pre-gelatinized in order to be rehydrated instantly. Fish and vegetables were blanched and dried before they were dry-mixed with turmeric powder. **Results:** Each serving size of NIP (150 g) provided approximately 23.93% carbohydrate, 15.33% protein, 2.09% fat, and 16.65% energy for adults as compared to the RDA. The samples could be simply served by heating in water (ratio 1:10) to regelatinize the starch. **Conclusions:** Development of instant Papeda is feasible and relatively simple so that it could be adopted by small-medium enterprises. The development of instant Papeda may involve the local government, sago supplier, potential local food industry, the community, and financial sector. The role of food technologists and nutritionists are also important to support the development of value-added sago-based product.

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The Effect of Pumpkin Flour Substitution on Nutrient Content and Sensory Acceptance of Biscuit

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Keywords: Pumpkin · Biscuit · Nutrient content · Organoleptic test

Background/Aims: Food diversification is an effort to improve the quality of human resources, agricultural development, and community health and nutritional status. One of the commodities from East Nusa Tenggara that can be processed into flour is pumpkin. This study aimed to determine the nutrient content and sensory properties of biscuits made from pumpkin flour. **Methods:** The experiment was conducted using completely randomized design. There were 5 treatments involved: P1 (100% wheat flour), P2 (75% wheat flour and 25% pumpkin flour), P3 (50% wheat flour and 50% pumpkin flour), P4 (25% wheat flour and 75% pumpkin flour), and P5 (100% pumpkin flour). The statistical analysis used was One-way ANOVA for data on nutrient content and Mann-Whitney U Test for the results of organoleptic tests. **Results:** The more pumpkin flour used in the biscuit formulation, the lower the protein and fat content of the biscuits. The sample P1 had 10.04% protein and 15.12% fat; while P5 had 4.21% protein and 10.61% fat. The content of ash, moisture, and carbohydrate also increased following the increased level of pumpkin flour incorporation into the biscuit formulation, where P1 had 2.16% ash, 3.08% moisture, and 69.59% carbohydrate. Meanwhile, P5 con-

tained 7.13% ash, 5.05% moisture, and 72.96% carbohydrate. Organoleptic test results showed that biscuit samples with a high composition of pumpkin flour had lower acceptability. **Conclusions:** Pumpkin flour had the potential to be used in bakery products such as biscuits in order to improve its nutrition profile.

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Formulation of Cookies with *Gabus* (*Channa striata*) Fishbone Flour as High Calcium Snack for School-Age Children

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Keywords: Calcium · Cookies · *Channa striata* · Fishbone flour · School-age children

Background/Aims: Calcium is essential for optimal growth and development of a child. Several supplementary feeding programs for school-age children focus on providing macronutrients as well as micronutrients needed by the children, including calcium. One of the alternative sources of calcium would be fishbone. Fishbone flour from *Channa striata* could be used to develop a supplementary food product with high calcium content as an alternative nutritious snack for school-age children. Cookies were chosen as the form of the product due to its practicality in consumption, storage, and transport. **Methods:** This study used experimental method and completely randomized design (CRD) with one factor and two replications. There were three percentages of *Channa striata* fishbone flour used in the formulation: 0% (F0), 10% (F1), and 20% (F2). **Results:** The sample with 10% fishbone flour was preferred by most panelists. The selected formulation contained 4.69% moisture, 3.94% ash, 7.16% protein, 27.88% fat, 56.09% carbohydrate, 341.70 mg calcium, and 504 kcal energy. **Conclusions:** Substitution of fishbone flour from *Channa striata* into cookies had the potential to increase the calcium content in cookies.

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Application of Neutron Activation Analysis in Evaluation of Essential Micro Minerals from Chicken and Beef in Java, Indonesia

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Keywords: Neutron activation analysis · Iron · Selenium · Zinc · Chicken · Beef

Backgorund/Aims: Meat plays a significant role as protein source for humans. In Indonesia, chicken and beef are the two most commonly consumed animal-derived protein food. This

study aimed to determine the essential micro minerals, such as Fe, Se, and Zn, in chicken and beef by analysis using nuclear analytical technique: Neutron Activation Analysis (NAA). **Methods:** A total of 69 samples of chicken and beef meat were collected from traditional markets in Java, Indonesia. Samples were irradiated for 2 h at thermal neutron flux of 1013 n.cm-2.s-1 in rabbit system facility of TRIGA MARK 2000 reactor in Bandung. After appropriate cooling time, samples were counted using HPGe gamma spectrometer. **Results:** The average value of iron, selenium, and zinc in chicken were 6.08 ± 3.99, 0.18 ± 0.14, and 12.04 ± 7.48 μg/g (wb), respectively. Meanwhile, beef contained similar minerals for 17.69 ± 18.34, 0.19 ± 0.20, and 35.80 ± 17.39 μg/g (wb), respectively. The distribution of the micro minerals was plotted based on the sampling sites on Java island. The essential micro mineral data were utilized to estimate the daily intake for Se, Fe, and Zn from the consumption of chicken and beef among children and adults. **Conclusions:** NAA could be used as an analytical technique to analyze micro minerals in food commodities such as meat.

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High Vitamin D and Calcium Porridge in Tuberculosis Patient with Vitamin D Receptor Gene Polymorphism

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Backgorund/Aims: The presence of polymorphism vitamin D receptor gene (VDR) TaqI and FokI in tuberculosis patient, being one of the predisposing vitamin D deficiency factor, besides lack of vitamin D daily intake and tuberculosis progression. Vitamin D and calcium deficiency could affect progression of the diseases. The objective was to assess the effect of high vitamin D and calcium porridge supplementation per day for 14 days on 25(OH)D serum, calcium levels, biomoleculer parameters, and sputum conversion in tuberculosis patients with vitamin D receptor gene polymorphism (TaqI and FokI). **Methods:** The study was a parallel clinical open trial, thirty nine subjects with vitamin D receptor gene polymorphism were selected using certain criterias. The subjects were devided into two groups using block randomization. Nineteen subjects in vitamin D group received high vitamin D and calcium porridge per day and dietary counseling (D), while twenty subjects in counseling group received dietary counseling (C). Time of sputum conversion, serum 25-hydroxyvitamin D, calcium, albumin, and Hs-CRP levels were assessed on day 0 and 14. **Results:** Nineteen subjects in D group and twenty subjects in C group completed the study. After 14 days intervention, there was significant increase in 25(OH)D serum level in D group while no change was observed in the C group (p = 0.03). There was no significant differences between both group for other parameters. **Conclusions:** The result shows that the high vitamin D and calcium porridge supplemetation could affect serum levels, but not sputum conversion for 14 days.

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Effect of Thermal Shock on Physicochemical, Microbiological, and Sensory Quality of Ready-to-Eat *Ambal* Satay at 25°C Storage

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Background/Aims: Ready-to-eat *Ambal* satay is a product that uses thermal shock principle to prevent the growth of bacteria, thus extending its shelf life. This study aimed to observe the effect of different thermal shock treatments on the physicochemical, microbiological, and sensory quality of *Ambal* satay at 25°C storage. **Methods:** This study used four thermal shock methods: P0 (control), P1 (cooling using 3°C water), P2 (cooling in refrigerator at 6°C), P3 (cooling in freezer at –24°C) after retort process at 121°C. Samples were taken in triplicates for analysis at week 0, 2, 4, 6, and 8. The parameters tested were chemical content, Total Plate Count (TPC), water holding capacity (WHC), pH, tenderness, and sensory quality. **Results:** The study showed that cooling method used to provide thermal shock after a high temperature process significantly affected the chemical content of *Ambal* satay in terms of protein, moisture, fat, and collagen content (p < 0.05). Physical test of the samples showed that pH and tenderness were significantly different among samples (P < 0.05), while the WHC among samples was not significantly different (p > 0.05), although there was a decreasing trend of it at prolonged storage time. Microbiological analysis showed a significant result (p < 0.05), while the number of microbes in treatment P1, P2, and P3 was still below the maximum microbiological contamination level according to SNI 2009, which was 10 superscript 6 colonies/mg. The sensory test showed that samples of P1, P2, and P3 were better accepted by the panelists as compared to P0 in terms of color, aroma, taste, texture, hardness, and overall acceptance. **Conclusions:** Provision of thermal shock in the form of cooling after heat treatment could provide *Ambal* satay with better characteristics.

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Proximate Composition of Crackers Developed from *Octopus cyaneus* as Affected by Combination of Mocaf Flour and Tapioca Flour

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Background/Aims: Crackers are traditional snack favored by Indonesians, which is made from wheat flour and tapioca flour, so that the dominant nutrient contained is carbohydrates. Modified

cassava flour , or commonly called as Mocaf, has better nutritional profile than tapioca flour. To improve the flavor and nutrient content of the crackers, especially its protein content, by addition of octopus in the crackers formulation. This study aimed to observe the proximate composition of octopus crackers made with varying combination of mocaf flour and tapioca flour. **Methods:** This research was carried out by varying the percentages of tapioca flour and mocaf flour in production of octopus crackers. Analysis of proximate composition included protein content (Kjeldahl method), fat content (Soxhlet method), carbohydrate content (by difference), moisture content (gravimetric method), and ash content (dry ashing method). Data collected were analyzed by the Kruskal-Wallis test. **Results:** There was a significant influence of the addition of octopus on the protein content of the crackers produced, thus helping it to improve its protein content to at least 5%. Moreover, the more mocaf flour used in the formulation, the higher the carbohydrate, fat, ash, and fiber content of the samples. However, increased amount of mocaf flour reduced the moisture content of the samples, resulting in dry and crispy characteristics of the crackers. **Conclusions:** Varying combinations of mocaf flour and tapioca flour significantly affected the proximate composition of octopus crackers.

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Dietary Fiber and Vitamin E in *Gedong Gincu* Mango (*Mangifera indica* L.*)* Butter

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Keywords: Manggo · Butter · Fiber · Vitamin E

Background/Aims: Butter is processed from milk fat which is tasteless and has high fat, energy, and vitamin A, however, it is low in fiber and other vitamins. Other ingredients could be added in production of butter to increase its taste and the nutrient content. *Gedong Gincu* mangoes have thick skin, high fiber content in the flesh, and strong aroma. This type of mango provides a quarter of vitamin C, two-third of vitamin A, and adequate vitamin E and fiber for adults' nutrition need. This study aimed to assess the fiber and vitamin E level of butter produced by mixing with *Gedong Gincu* mango. **Methods:** This study used a completely randomized design with four formulas using cow milk, plain butter, and *Gedong Gincu* mango juice. The experiment was conducted in duplicate. Fiber content of samples was analyzed using multi enzyme method and vitamin E level was tested using spectrophotometry method. **Results:** Addition of *Gedong Gincu* mango juice increase the fiber and vitamin E content of butter. Addition of the mango managed to increase the fiber content of the butter from 0 to 2.5%, while the highest vitamin E content level of 0.56% was found in the sample formulated with 50 g cow milk: 100 g plain butter: 150 g *Gedong Gincu* mango juice. Addition of mango juice also gave sweet taste, imparted the butter with the fragrant aroma of mango, and provided yellow color for the butter. **Conclusions:** The use of mango juice in formulation of butter helped to increase its nutritional profile and sensory characteristics.

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"ANEMIA CAFE": Effect on the Levels of Hemoglobin, Consumption of Fe, and Nutritional Status of Female Students in Junior and Senior High Schools

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Keywords: Anemia · Female students · Hemoglobin · Nutritional status

Background/Aims: Educating young women will bring strong influence in the society since they will eventually have their own family. The high number of anemia in female students (71%) results in low quality of learning and undernutrition status (64%) among students of junior and senior high schools in Gemaharjo. Gemaharjo Health Center is the first health center in Indonesia to have an "ANEMIA CAFE" program facilitated by nutritionists with activities as follows: school rules related to the program, anemia classes, iron (Fe) consumption card, supporting friends system, anemia coins, supply of Fe tablets, and anemia squad. This research aimed to reduce the number of anemia and improve the nutritional status of female students in junior and senior high schools in Gemaharjo. **Methods:** The experiment was conducted for 6 months involving 1654 female students and data collected were analyzed with One-Way ANOVA ($p = 0.01$ and $p = 0.02$). **Results:** The program was found able to reduce the number of anemia cases (71% to 33%) and improve undernutrition status (64% to 23%) among junior and senior high schools female students in Gemaharjo. **Conclusions:** "ANEMIA CAFE" program could reduce the cases of anemia and improve under nutrition status in female students.

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Effects of Different Cooking Methods and Addition of Palm Oil A on Bioaccessibility of Beta Carotene Content of Sweet Leaf (*Sauropus androgynous*)

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Keywords: Beta-carotene · Bioaccessibility · Cooking method · Palm oil · *Sauropus androgynous*

Background/Aims: Beta-carotene is one of phytochemicals that plays a role as natural antioxidant to help reduce oxidative stress, which is eventually linked to decreased risks of non-communicable diseases (NCDs). Sweet leaf (*Sauropus androgynous*) contains high amount of beta-carotene. However, the bioaccessibility of beta-carotene in sweet leaf might be altered as affected by cooking methods. Therefore, the effects of different cooking methods (raw, boiling, and microwave cooking) and addition of palm oil on the bioaccessibility of beta-carotene of sweet leaf were investigated in this study before and during in vitro simulated gastroin-

testinal digestion. **Methods:** There were three cooking methods (raw, boiling, and microwave cooking) and several percentages of addition of palm oil were performed in the experiment. **Results:** Boiling and microwave cooking had lowered the content of beta-carotene in cooked sweet leaf as compared to raw leaf. However, addition of 10% (v/w) palm oil during cooking helped increasing the bioaccessibility of beta-carotene after digestion in all cooking methods as compared to those without palm oil addition (p < 0.05). In addition, the bioaccessibility of beta-carotene increased to about 20% when palm oil was added into the microwaved sweet leaf. **Conclusions:** Addition of 10% (v/w) palm oil during cooking could improve the bioaccessibility of beta-carotene in sweet leaf, especially if the sweet leaf was microwaved.

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Screening of Chinese Herbal Medicines with Anti-Obesity Effects

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Keywords: Anti-obesity – Chinese herbal medicines – Corni fructus

Background and objective: Obesity occurs when excessive adipose tissue accumulates in the body due to the metabolic and hormone changes. It is estimated that about 2.3 billion adults worldwide will be overweight and more than 700 million obese. Compared to the non-obese population, obese people tend to have a higher incidence of osteoarthritis, cruciate ligament injury, diabetes mellitus, intervertebral disc disease, and hypothyroidism. Many studies demonstrated that some compounds from natural sources possess the management of body weight effects. This study was conducted to screen the Chinese herbal medicines with anti-obesity effects. **Methods:** The anti-obesity effects of Chinese herbal medicines, including Geranium nepalense,Corni fructus, Schisandra chinensis, and Rubi fructus, were evaluated by using the mouse preadipocyte cell line 3T3-L1 cell model. The 3T3-L1 cells were induced to differentiate using 3-isobutyl-1-methylxanthine, dexamethasone, and insulin (MDI) for 8 days in the presence of Chinese herbal medicines. Then, Oil Red O staining was performed to determine the lipid accumulation in 3T3-L1 cells. The Chinese herbal medicine showed highest inhibitory effect on lipid accumulation of 3T3-L1 cells was further evaluated its anti-obesity effects in high-fat diet-induced obese rats. **Results:** The results showed that Geranium nepalense,Corni fructus, Schisandra chinensis, and Rubi fructusinhibited lipid accumulation in 3T3-L1 cells. The administration of Corni fructusprevented weight gain in obese rats fed with a high-fat diet. **Conclusions:** These results proven that Corni fructushas a potential to be used as functional food ingredients for the management of obesity.

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Mother-Baby Friendly Philippines: An Innovative Mobile Application to Report Milk Code Violations

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Keywords: Code · Marketing · Breast milk · Formula
Background/Aims: Recognizing the urgent need to strengthen the enforcement of the Philippine Milk Code (E.O 51) and the Expanded Breastfeeding Promotion Act (R.A 10028), World Vision Development Foundation, Inc. in partnership with the Department of Health (DOH) implemented the Mother-Baby Friendly Philippines (MBFP) project. The project aimed to improve enactment of EO 51 and RA 10028 by increasing knowledge among the general public and through enhanced reporting system. **Methods:** The reporting system addressed limitations of the earlier Milk Code Philippines website by providing a timely feedback to those who reported Code violations. The reporting platform included a web-based reporting tool, mobile application designed both for Android and IOS users, and Short Message Services (SMS). **Results:** Of the three reporting platforms developed, the mobile app (53.2%) and website (46.8%) were widely used to report violations. Since the reporting system was launched, 140 reports had been investigated by the concerned government agency. **Conclusions:** Launching a reporting system is not difficult, but designing it according to the needs and use required for the Philippines context, both of the concerned National Government Agencies and the general public, requires an iterative process. In the case of the public, enhancements such as a growth monitoring chart and early child development checklist were added after pilot-testing to serve as "hooks" for users to download and continue using the MBFP mobile app.

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Bridging the Gap between Legislation and Law Enforcement: The Philippines Interagency Committee as an Innovative Reporting Application for Enforcement of Milk Code

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Keywords: Code, Marketing, Breast milk, Formula
Background/Aims: The Executive Order (EO) 51 "Philippines Milk Code" and the Republic Act (RA) 10028 "Expanded Breastfeeding Promotion Act" both protected and promoted breastfeeding in the Philippines. Unfortunately, there was low awareness and lack of human resources to follow-up on reported violations. To overcome such difficulties, the Mother-Baby Friendly Philippines (MBFP) project developed an enhanced reporting system using a mobile app and a website to increase public awareness on the two laws and provide a platform for reporting violations. **Methods:** World Vision Development Foundation, Inc. worked collabora-

tively with the Department of Health (DOH) to build capacity of the Interagency Committee (IAC) to enforce the laws and act on reported violations. IAC members were trained on using the reporting platform, particularly managing docketed reports shown in their dashboards. The updated reporting system allowed DOH to validate, transmit the report to concerned government agency, and take necessary actions. Twelve IAC members were trained on using the reporting platform to follow-up, verify, and respond to reported violations. **Results:** Of the 154 reports received, 140 reports were investigated and 5 were deemed valid and transmitted to concerned government agencies for further investigation or to pass the necessary punitive sanctions. Through MBFP project, IAC members realized that the scope of their function goes beyond reviewing and issuing approvals for marketing materials covered by the Code. **Conclusions:** Addressing the gaps in the system and process and providing policies that will guide the implementation of the Philippines Milk Code, which is a critical element to strengthen the implementation of the act.

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Effect of Ultrafine Bubble Water in Animal Models with Type 2 Diabetes Mellitus

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Keywords: Ultrafine bubble · Type 2 Diabetes Mellitus · Insulin sensitivity
Background/Aims: Fine bubble is defined as an air bubble with a diameter of <100 μm. A bubble of <1 μm (ultrafine bubble, UFB) can be stable for a long time underwater. UFB is used in various fields, such as industrial, agriculture, marine products, food, and medical care industries. Several biological effects of UFB have been reported, such as growth stimulatory effect. However, there have been no published studies examining the effect of UFB water on diabetes. Thus, this study examined the effect of UFB water in animal models. **Methods:** UFB water was produced by a UFB generator that applied cavitation technology (Tanaka Metal Factory CO., LTD., Japan). Animal models of type 2 diabetes mellitus used in the experiments were diet-induced obese (DIO, C57BL/6J) mice with insulin hypersecretion and moderately impaired glucose tolerance (IGT), Goto-Kakizaki rats with insulin hyposecretion and moderate IGT, and Zucker Diabetic Fatty rats with insulin hyposecretion and severe IGT. The animals ingested diabetogenic high-energy diets and UFB or tap water ad libitum for a set period. **Results:** Regardless of the degree of bolus insulin secretion and IGT, the blood glucose level in oral glucose tolerance test decreased in the UFB water group compared to the tap water group. Expression of genes might be associated with the hypoglycemic effect mechanism. **Conclusions:** The use of UFB water could help decrease blood glucose level, thus it would be suitable for diabetes.

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Psychological Effects of Color and Line Thickness of Dish Rims on Visual Palatability of Meals among Individuals with Low Vision

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Keywords: Low vision · Universal design · Visual palatability
Background/Aims: Cooking and eating for dietary control is difficult for individuals with low vision. A dish rim line thickness of 8 mm has been shown to be the most effective universal design (UCD).The present study examined the psychological effects of a combination of dish rim line and background colors on the visual palatability of meals among individuals with low vision. **Methods:** The participants of this study were 80 university students who were sat in front of an LCD screen in which a meal tray with dishes having a rim line thickness of 8 mm was projected. Five dish types (rice, one main dish, two side dishes and pickles) were placed on top of the tray. After observing the samples, the participants answered a questionnaire. The results were then compared between two groups: a low vision group, in which the participants wore glasses to simulate low vision, and a healthy group, in which participants did not wear the simulation glasses. **Results:** The images and visibility for each dish rim line thickness were defined by the SD method using 12 antonymic adjective pairs. The factors of 'comfort' and 'activity' were extracted using factor analysis. In addition, the examination of the combination of color schemes in a universal design showed that purple edging with a dark grayish tone was highly evaluated for all tray colors. Meanwhile, orange in a bright tone and yellow in a pale tone were found to be useful for improving visibility and comfort, respectively. **Conclusions:** Combination of color and line thickness of dish rim and tray color affected visual palatability of meals in people with diabetes.

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Tropical Oils Blending and Their Effects on Nutritional Contents and Physicochemical Properties During Deep Fat Frying

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Keywords: Vegetable oil – Blending – Deep fat frying -Nutrition
Background/Aims: Blending of oils is one of the other methods that could improve the nutritional profile and stability of frying oil. **Methods:** Tropical vegetable oils including rice bran oil, coconut oil and palm oil were blended at the ratio of 20:20:60, 25:25:50, 30:30:40, and 35:35:30 (v/v/v), respectively and tested for their performance during deep frying of French fries at 180 °C for 8 hours.

Results: The nutritional contents of blended oils including poly-unsaturated fatty acids, a-tocopherol and g-oryzanol increased with the increase of rice bran oil and coconut oil ratio. The changes in physicochemical properties including color, viscosity, fatty acid profile, total polar compounds, free fatty acid, peroxide value, and thiobarbituric acid reactive substances concentrations of blended oils were monitored during frying. Lightness and yellowness of oil blends were lower than those of palm oil after frying. However, the higher ratio of rice bran oil and coconut oil results in the higher increase in viscosity during frying. The oxidative stabilities of oil blends were better than that of palm oil. In addition, the sensory characteristics of the fries prepared in these oil blends were evaluated using 9-point hedonic scale. There was no significant difference in sensory attributes of fries produced using different oils. The oil blend at ratio of 30:30:40 shows the greatest performance as deep frying media compared to the others.

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Makmao (*Antidesma sp.*) Seed Extracts and Their Health Promoting Properties

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Keywords: Makmao – Seed – Antioxidant – Extract
Background/Aims: Makmao is a tropical fruit widely grown in Northeastern Thailand. The fruit is nutrient rich and can be processed into various products e.g. juice and wine which produced seeds as major wastes from the process. Thus, the aim of this study was to investigated the properties of the seeds extracts from 3 cultivars of Makmao fruit including Yaikumta, Kumla, and Tepnimit at 2 different stages of ripeness (red and dark purple) using either ethanol or hexane as extraction solvent. **Method:** Percent yield, color, total phenolic, total flavonoid and anthocyanin contents of the extracts were determined. Moreover, antioxidant activity of the extracts was evaluated using 2,2-diphenyl-1-picrylhydrazyl radical scavenging capacity assay (DPPH assay), 2,2'azinobis (3-ethylbenzothaia zoline-6-sulfonic acid) cation radical scavenging assay (ABTS assay) and ferric reducing antioxidant power (FRAP assay). **Results:** The results show that the % yields were in the range of 5.59 ± 0.67 to 15.58 ± 2.42 (by wt). The extract from seed of Yaikumta cultivar at fully ripe stage (dark purple) using ethanol as a solvent contained the highest total phenolic contents (6.33 ± 0.37 meq gallic acid/g extract) and total flavonoid contents (7.28 ± 0.64 meq catechin/g extract). On the other hands, the extract from seed of Kumla cultivar at fully ripe stage (dark purple) using ethanol as a solvent contained the highest total anthocyanin contents of 0.41 ± 0.01 meq cyanidin triglucoside/g extract. The antioxidant activity of the extract from seed of Yaikumta cultivar at mature stage (red) using ethanol as a solvent was the highest compared to the other using the DPPH, ABTS and FRAP assay.

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Physicochemical Properties of *Tempe* Protein Isolated from Germinated and Non-Germinated Soybeans

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Keywords: Soybeans · *Tempe* · Germination · Protein isolate · Physicochemical properties
Background/Aims: *Tempe* is an indigenous source of protein in Indonesia. This study aimed to determine effect of germination of soybeans on physicochemical properties of *tempe* protein. **Methods:** In this study, *tempe* sample was produced from Grobogan soybeans with two treatments: germinated and non-germinated soybeans. The two types of *tempe* produced were then processed into protein isolates, namely: *tempe* protein isolate from non-germinated soybeans (NGTI) and *tempe* protein isolate from germinated soybeans (GTI). Data collected were physicochemical properties of NGTI, GTI, and CSI (commercial soy protein isolate). **Results:** Based on the physical characteristics, NGTI and GTI were superior to CSI in terms of their bulk density, which was significantly higher ($p < 0.01$) at 0.54, 0.57 and 0.39 g/mL, respectively. Moreover, the a_w values of the two samples were significantly lower ($p < 0.01$) at 0.05, 0.04 and 0.34, respectively. As for chemical characteristics, the NGTI and GTI were superior to CSI in their protein content, which was significantly higher ($p < 0.01$) at 79.16, 82.89 and 74.90%, respectively. In vitro protein digestibility of NGTI and GTI was also significantly higher ($p < 0.05$) than that of CSI, at 76.95, 77.82 and 76.68%, respectively. Meanwhile, the values of fat content of the two samples of protein isolate from *tempe* were significantly lower ($p < 0.01$) at 1.45, 1.28, and 2.74%, respectively. **Conclusions:** Protein isolate from tempe, produced from either non-germinated and germinated soybeans were found to have better physicochemical characteristics than commercial soy protein isolate.

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Antioxidant Activity in Functional Bread Added with Coconut Mesocarp Fermented Using *Trametes Polizona*

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Keywords: Coconut mesocarp · Solid-state fermentation · Antioxidant activity
Background/Aims: Free radicals are very unstable and they react quickly with other groups or substances in the body. Anti-

oxidants contained in a diet can protect against diseases related with the oxidative stress. They can be added in production of functional food. The aim of this work was to evaluate phytochemical content and antioxidant activity of dried and fermented coconut mesocarp that had gone through solid-state fermentation (SSF) with *Trametes polyzona* and its effect on bakery products e.g. baguette. **Methods:** Total pholyphenol content was determined using the Folin–Ciocalteu method. **Results:** The phenolic content in the dried sample was 138.15 µg gallic acid equivalents (GAE) while the fermented coconut mesocarp contained 26.33 µg GAE of total phenolic content. The lowest concentration was found at 2.36 µg GAE for bakery product. The highest antioxidant activity evaluated with DPPH method was seen in dried coconut mesocarp with 76.4 % inhibition, followed by fermented coconut mesocarp with 42% inhibition, and the lowest activity was 18.5% inhibition in the bakery product. The highest antioxidant activity evaluated with ABTS method was seen is dried sample with 177.56 µM trolox (TE), followed fermented by coconut mesocarp with 42 µM trolox (TE), and the lowest was 4.16 µM TE in baguette. The antioxidant activity in baguette with fermented coconut mesocarp was 51.8 % higher than the control bread. **Conclusions:** Coconut mesocarp could be used in the formulation of bakery product to give a higher content of phenols, which could improve the antioxidant capacity and nutritional quality of the product.

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Development of Food Formula from Vegetables, Fruit, and Nuts to Improve Nutritional Status and Blood Profile of Obese Students

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Keywords: Formula food · Overweight · Blood profile · Nutritional status
Background/Aims: Nutritional status and blood profile are influenced by nutrient intake. Results of assessment of nutritional status of students in the Nutrition Department of Health Polytechnic Jakarta II showed 21.6% of them were overweight and obese. Food formulas with lower energy content and relatively high bioactive components could be expected to help reduce weight and improve blood profile. Thus, the aim of the study was to determine changes in nutritional status and fasting blood sugar and triglycerides of obese students as affected by provision of food formula based on vegetables, fruit, and nuts. **Methods:** The experiment was conducted using Randomized Control Trial design and the subjects were obese students at Nutrition Department, Health Polytechnic Jakarta II. The subjects were divided in two groups, each with 15 people assigned for the control and experimental groups. The study took 6 weeks to complete with where the subjects were given the food formula for 5 days each week. Paired t-test, with p = 0.05, was applied to determine differences in nutritional status and blood profiles of the subjects. **Results:** Formula food contained e152–160 kcal energy, 4–6 g protein, 600 µg total flavonoids, and

17.88 µg anthocyanin per serving (38 g). The mean weight loss in the control and experimental groups was 1.07 kg and 1.63 kg, respectively, and there was no significant difference (p > 0.05) among them. In both groups, there was a decrease in fasting blood glucose levels, but the triglyceride levels increased and there were significant differences in changes in fasting blood glucose levels and triglycerides (p < 0.05). **Conclusions:** Formula food based on vegetables, fruit, and seeds could help to improve nutritional status of obese students.

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Tablet-Based Multiple-Pass Dietary Recall Application to Collect Dietary Intake of Under-Two Children in A Prospective Cohort Study in Indonesia

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Keywords: Cohort · Indonesia · Tablet-based dietary application · Under two-year-old children
Background/Aims: Dietary intake data are crucial for developing nutrition intervention to improve nutritional status of population, but it remains challenging to obtain accurate and reliable dietary data especially in developing countries. With the emerging technology, it is now feasible to collect reliable dietary data with the use of electronic data collection. The purpose of this study was to develop electronic data collection, which can accommodate the principle of multiple-pass 24-h dietary recall (24HR) in a cohort study. **Methods:** The study was part of the Baduta project, which evaluated the effectiveness of integrated nutritionsensitive and nutrition-specific intervention to reduce stunting and anemia among under two-year-old children and mothers in East Java, Indonesia. The *CommCare* platform was used for electronic data collection. **Results:** Among 680 cohort children, dietary data were collected using electronic data collection, while paper-based 24HR was conducted among 2,000 under two-yearold children in a cross-sectional survey. Approximately 76, 86, and 90% of respondents aged 6–8 mo, 9–11 mo, and 12–23 mo, respectively, were classified as acceptable energy reporters (within 95% CI of Energy Intake to Total Energy Expenditure (EI:TEE) ratio). These proportions were lower for the paper-based interview i.e. 45, 57, and 61%, respectively. The energy and nutrient intakes were comparable between paper-based and tablet-based dietary data. **Conclusions:** Dietary data collection using tabletbased application was feasible and could be a reliable tool in a longitudinal cohort study. This findings could help creating an.

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Going Digital: A New Concept for Indonesian Food Composition Database

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Keywords: Nutrition facts · Food databases · Food composition databases · Digital food database · Nutrition value

Background/Aims: Current Indonesian nutritional value information of foods is available only as hardcopies (TKPI) that of course are not conveniently mobile. There is currently no media or reference that provides information on nutritional value of foods unless people check the label of processed food products available in the market. The purpose of this research was to develop digital database of food and packaged food. **Methods:** The digital database was developed using waterfall method (requirement engineering, design and implementation, testing, release and maintenance). Evaluation was conducted using descriptive statistics in the form of table and diagrams. **Methods:** The users were given a questionnaire to give judgment on aspects of digital TKPI in terms of usefulness, satisfaction, and ease of use by providing a score within the value of 1–7. The usability of the website nilaigizi.com was also assessed through USE Questionnaire. **Results:** In terms of level of consumers' satisfaction, the digital form of TKPI that was developed was preferred by users who previously used the printed version of TKPI. The average scores of the three assessment criteria namely usefulness, satisfaction, and ease of use showed that the three criteria attained more than 80%. The highest score was for ease of use and learning criteria at 83.5% and the lowest score was on satisfaction criteria at 81.7%. **Conclusions:** TKPI could be designed in digital form to provide better experience for users.

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Comparison of Effectiveness of Food Databases Available as Books, Desktop Software, and Website

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Keywords: Nutrition facts · Food databases · Food composition databases · Digital food database · Nutrition value

Background/Aims: Nutritionists in Indonesia usually refer to food database published by the government to check the nutritional value of a food. The database was initially available only in hardcopies, which were inefficient. Thus, program-based database was developed for use on personal computers (desktops) and on the internet (website). Unfortunately, similar problem on efficiency still remained. Therefore, the purpose of this study was to assess the most effective form of food database. **Methods:** The research was conducted using analytic-comparative design with cross sectional related study that was performed on 415 active nutrition students in Indonesia. Sampling was carried out using the snowball sampling method and the study was conducted in August-November 2018. Data collected were analyzed by ANOVA and Tukey's LSD post-hoc test. **Results:** There was a significant difference in the use of the databases (p = 0.0001) with the average website use of 8.00 ± 1.09, which was higher than the value for desktop at 7.77 ± 1.26 and books at 6.95 ± 1.64. **Conclusions:** The use of a website-based food database was found to be more effective as compared to the use similar material on desktop and books.

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The Relationship of Health and Nutrition Claims towards Purchasing Choices among Adult Consumers in Shah Alam, Selangor

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Keywords: Health claims · Nutrition claims · Health awareness · Purchase intention

Background/Aims: Consumers nowadays have more awareness for healthy foods and demanded healthier food choices to avoid health-related problems; therefore, industries had included health and nutrition claims on their products. Health and nutrition claims usually influence consumers' food choice decision. Products with health claim resulted in higher perception of healthiness and nutritional value of the product, even if the product was not considered as a healthy choice. The aim of this study was to assess whether the health and nutrition claims had led to a healthier perception or better evaluation of the product among consumers. **Methods:** A cross-sectional survey was conducted using an online questionnaire on 385 respondents collected through convenience sampling. The survey consisted of four parts: socio-demographic background, health awareness, understanding and usage of health and nutrition claims, and purchase intention measured through the use of a mock packaging. Data collected were analyzed using SPSS version 22. **Results:** Most of the respondents aged 18–30 (81.0%) and almost half of them were Malay (45.7%) with bachelor/master or PhD qualification (60.0%). The distribution of household income for all categories was almost similar (18.2%-20.8%). There was a significant statistical relationship between health awareness and purchase intention among respondents (r = 0.391, p < 0.01). **Conclusions:** Health and nutrition claims influenced consumer's perceptions and purchase intention, especially for those who were more concerned about their health, thus, more focus on policy regarding claims is needed.

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Evaluation of Nutritional Status of Cancer Patients during Hospital Stay by *Vietnam Novel Brief Nutrition Screening Tool*

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Keywords: Nutritional status · Cancer patients · Vietnam · BBT

Background/Aims: The study aimed to assess the nutritional status of cancer patients at 108 Military Central Hospital by Vietnam Novel Brief Nutrition Screening Tool (Bach Mai Boston Tool – BBT). **Methods:** From 170 patients, who were first diagnosed with cancer at 108 Military Central Hospital from April 2018 to June 2018, 69 patients were selected, and they were evaluated by BBT at the last day of their hospital stay. Before and after discharge data, which included nutritional status and blood test results (protein, albumin, lymphocyte, and hemoglobin), were collected. **Results:** Before getting discharged, there were 50.7% of patients who were moderately malnourished (BBT-B), 11.6% with severe malnutrition status (BBT-C), 43.5% were with chronic energy deficiency (BMI<18.5), 26.1% with hypoalbuminemia, 13.0% with hypoproteinemia, and 63.8% with lymphocytopenia. The number of cancer patients with malnutrition decreased slightly after discharge, where 44.9% of them were with moderate malnutrition (BBT-B) and 8.7% were with severe malnutrition (BBT-C). Assessed by Mc-Nemar test, differences in blood test results during and after hospital stay were not statistically significant (p > 0.05), even though it was shown that the prevalence of hypoalbuminemia and lymphocytopenia went up to 24.6% and 69.6%, respectively, while hypoproteinemia went down to 7.2%. A significant difference was found in anemia status, which rose up from 49.3 to 56.5% after discharge. **Conclusions:** The prevalence of malnutrition in cancer patients before and after discharge were high, while anemia status improved after hospital stay. Thus, the Vietnam Novel Brief Nutrition Screening Tool (BBT) should be used in screening nutritional status on the first day of the hospital stay.

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Development of Vegetable Seasoning and the Effect of Hot Air Drying on Beta-Carotene Content

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Keywords: Vegetable seasoning – Beta-carotene – Hot air drying

Background/Aims: Beta-carotene is also known as pro-vitamin A, an important contributor to improve eye health, found abundantly in plant-based foods with dark green, yellow, and orange pigments. Drying is one of the most cost-effective methods of food preservation. This research was therefore aimed to study the development of vegetable seasoning and the effect of hot air drying on beta-carotene content. **Methods:** Based on the consumer survey and quantity of beta-carotene; carrot, pumpkin, Chinese kale, and Cilantro ancho were selected for an expectation of the final moisture content less than 10%. The vegetable seasoning formula was developed using Just about right and Hedonic 9 point test. **Results:** The study found that drying curves of sliced carrot and pumpkin resulted in a drying times of 6 hours, while Chinese kale and Cilantro ancho leaves took 4 hours to dry. After drying, the retention of beta-carotene in Carrot pumpkin Chinese kale and Cilantro ancho was 89.77%, 40.08%, 74.99% and 97.53%, respectively. The optimal seasoning formula consisted of 66.8% mixed dried ground vegetables, 13.4% sugar, 8.8% salt, 6.7% garlic powder, and 4.3% white pepper powder. The overall acceptability of the product was rated as moderately liked and it contains 178.04 ± 3.30 mg/g of beta-carotene (vitamin A 29.67 ug RE/g). **Conclusions:** This formulation may be useful for the regular consumption in order to fortify vitamin A level and solve the issue of vitamin A deficiency.

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The Optimal Condition for the Production of Thai Jasmine Rice (Milky Period) Flake Using Drum Dryer

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Keywords: Young rice grain · Drying · Drum dryer · Rice flake

Background/Aims: Rice is mainly the staple food in Thailand with people preferring Thai Jasmine rice variety than others. Interestingly, immature rice grain has been also consumed as the traditional dessert. Many studies have suggested that the developing rice grains have relatively high amount of phytochemical sources and would be suitable for food applications such as porridge, cereal and soup. The optimal condition for the production of Thai Jasmine *rice* (milky period) flake using double drum dryer is therefore interested. The objective of this research was to investigate the effects of the ratios of young rice grain to water (1:31:5 and 1:7w/w) and the different drum rotation speed (0.5, 0.7 and 0.9 rpm) on the properties of rice flakes at 0.25 mm of the gap between drums and 120 °C of drying temperature. **Results:** The results indicated that increasing rotation speed gives significant effect (p < 0.05) on the higher value of moisture content and water activity, whereas % yield was not significantly different. The flake product indicated that using lower water ratio with slowing down rotation speed resulted into higher brightness of product and quicker rehydrated. The optimal ratio of young rice grain at milky stage to water was 1:5w/w with 0.5 rpm drum speed. The milky rice flake had 0.189 ± 0.002 water activity and 4.250 ± 0.130% moisture content. The color values of L^*, a^* and b^* were 44.790 ± 0.360, 1.460 ± 0.010 and 12.170 ± 0.160, respectively. The proximate analysis was 0.004 ± 0.001% fat, 6.140 ± 0.480% protein, 0.920 ± 0.170% ash, 88.686% carbohydrate. The microbial properties of the product were below the maximum standard.

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Analysis of Food Management System: Relationship between Quality of A La Carte Menu, Price Suitability, and Service Quality with Purchase Decision in Airport Hotels and Suites in Jakarta

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Keywords: Quality of a la carte menu · Price suitability · Service quality · Purchase decision

Background/Aims: The purpose of this study was to analyze the food delivery system and find out the relationship between the quality of a la carte menu, price suitability, and service quality with purchase decisions in airport hotels and suites in Jakarta. **Methods:** The study was conducted using a cross sectional design. Accidental sampling technique was used and a total of 38 respondents were collected. **Results:** Respondents mostly came from early adult category, with majority of them were male who worked as employees with frequency of stay of one day and the most frequent number of purchase was twice. The most purchased item on a la carte menu was *kampung* fried rice. Chi-Square test revealed a relationship between the quality of the a'la carte menu and price suitability with purchase decision (p = 0.001, p > 0.05), and there was no relationship between service quality and purchasing decisions (p > 0.05). The food organizing system applied in those hotels and suites was deemed to be sufficiently appropriate. However, there was no temperature checking of food ingredients at receiving point and sanitary equipments were absent. **Conclusions:** Promotional menus could be used as a strategy to increase purchase.

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Nutrition Education Potentially Improves Breakfast Quality of Adolescents from Low-Mid Socioeconomic Background

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Keywords: Nutrition education · Adolescent · Breakfast

Background/Aims: Low quality of breakfast has been reported among children and adolescents in Indonesia. This unhealthy eating behavior should be improved and nutrition education is a strategy to promote healthy behavior. This study aimed to evaluate effect of nutrition education intervention on adolescents' breakfast quality. **Methods:** An intervention study was conducted at four low-ranks public senior high schools in Makassar, Indonesia. Nutrition education intervention was applied for 3 months and it was delivered through a multi-activities strategy (G1) vs. a paper-based strategy (G2). Breakfast consumption data was collected at three sessions using 3-days breakfast recall technique. Breakfast quality was assessed according to individual's score and computed both qualitatively and quantitatively. Paired-t test and chi-square test were used to determine the intra- and inter-group differences in breakfast scores for each session. **Results:** Breakfast scores did not show significant difference (p > 0.05) between pre- and post-intervention in both groups, although there were slight changes in the values. Mean score significantly improved between pre-intervention and follow-up only in G2 (p = 0.005), however, the score still indicated low quality of breakfast. The number of adolescents having good breakfast increased only at follow-up for G1 (p > 0.05). For G2, there was no significant difference, although there was a slight increase at post-intervention and follow-up. There were no significant differences observed between both groups, both in breakfast scores and in number of adolescents with high quality breakfast. **Conclusions:** Nutrition education intervention could potentially improve breakfast quality of adolescents from low- and mid-socioeconomic background, however it should be supported with other actions and it requires longer duration to provide long term positive effect.

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Physical and Functional Properties of Fermented Local White Corn Flour from *Anoman* FS Variety

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Keywords: Fermented flour · Corn flour · White corn · Maize

Background/Aims: The aim of the research was to determine the physical and functional properties of local white corn flour from *Anoman* FS variety as a result of fermentation process. **Methods:** Fermentation was carried out by adding indigenous yeast collected from the previous studies (10 isolates). Three types of starter were added: (1) AC1, a complete starter culture containing 10 microbes added at the beginning of fermentation (0 h) followed by additional inoculation of the amylolytic starter culture at 16 h of fermentation; (2) AC2, similar to AC1 with added amylolytic starter culture at 16 and 32 h of fermentation; (3) NTS, inoculated nontoxic microbes at the beginning of fermentation (0 h) and additional inoculation of the amylolytic starter culture at 16 h and 32 h of fermentation. Observations were done on flour made from corn grits after 0, 36, 48, 60, and 72 h fermentation. **Results:** Type of starter and duration of fermentation influenced the physical and functional properties of flour, namely bulk density, true density, degree of whiteness, oil absorption capacity, water absorption capacity, gelatinization temperature, flour resistance when heated and during cooling, as well as peak, through, and final viscosity,. Analysis with SEM showed duration of fermentation caused the shape of the granule to not be intact, where the edge was broken, the size of the granule was reduced, and the distance between the granules was stretched. **Conclusions:** Based on the results of the test properties of pasta, fermented white corn flour might be suitable for production of noodles, cookies, and fried products.

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Light Wavelength for Measurement of Non-Invasive Blood Glucose Level with Optical Device

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Keywords: Non-invasive · Blood glucose level measurement · Optical device · Review

Background/Aims: Current invasive phlebotomy-based blood-glucose-level (BGL) measurement has an unacceptable level of risk for daily personal use. Researchers have been working for a spectrophotometric method that has great potential for mitigating the risk. However, it has not been determined globally yet which wavelength would be suitable for non-invasive blood glucose level measurement with optical device (NI-BGL-MOD). The objectives were to list and categorize light wavelength that have been used by previous researchers for NI-BGL-MOD. **Methods:** This study collected research articles within the last 20 years from journals and proceedings indexing services, such as Scopus, Medline, and Google Scholar. The light wavelength was categorized into four categories: visible, near-infrared, mid-infrared, and a Raman scattering wavelength. Each category was described with several examples. Besides that, they have also incorporated properties considerations that may interfere with NI-BGL-MOD. **Conclusions:** Each light wavelength category might be potential to be used for NI-BGL-MOD.

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Sensitivity and Specificity of Non Invasive Blood Glucose Level Measurement Optical Device to Detect Hypoglycaemia

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Keywords: Non-invasive · Blood glucose level measurement · Optical device · Hypoglycemia

Background/Aims: Hypoglycemia is related to lethargy, psychiatric disorders, and impaired brain metabolism. Hypoglycemia is one of the leading causes of death in blood glucose level (BGL) metabolism disorders. Optical methods have been heavily researched due to its potential to eliminate drawbacks of conventional hypoglycemia detection; however, clinical data are still scarce. The objective of this study was to measure sensitivity and specificity of non-invasive BGL Measurement Optical Device (NI-BGL-MOD) to detect hypoglycemia compared to venipuncture spectrophotometry. **Methods:** The method NI-BGL-MOD has been developed, which was used in a clinical trial in December 2015. Spectral data collected from the device were used to measure the BGL of randomly selected 110 participants who were older than 17 years old. Each participant was measured five times, resulting in 550 data sets that were then compared to BGL measurement using venipuncture spectrophotometer. The spectral data were optimized using Discrete Fourier Transform and inferred to BGL prediction using Fast Artificial Neural Network. Hypoglycemia case was defined with BGL level at 75 mg/dl or lower. Sensitivity and Specificity were calculated using epiR in Rstudio. **Results:** Respondents' BGL values were between 67 to 96 mg/dl. There were 89 cases that were classified as hypoglycemia and 461 cases were not defined as hypoglycemia. The sensitivity was 54% and the specificity was 97%. Diagnostic accuracy was 86% and the number to diagnose was 1.96. **Conclusions:** The newly developed method NI-BGL-MOD could be used to detect hypoglycemia.

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Development of Nutrition Learning Models for Elementary School Children in Kendari

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Keywords: Nutrition learning model · Elementary school children

Background/Aims: A nutrition learning model themed "*Makananku Sehat dan Bergizi*" was aimed for fourth-grade students of elementary school who used the K13 Curriculum K13 that was developed in 2013. The model accommodated the old version of nutrition concept and they were delivered with conventional model. This study aimed to design a new learning model and to discover effect of the model on nutritional knowledge and behavior of elementary school children in Kendari. **Methods:** This study was a quasi experimental study using one group with pre-post test design. This study was held in 2017 in Puuwatu district, Kendari. The subjects were 15 fourth-grade teachers and 60 elementary school students from SD 05 Mandonga. Data related to knowledge and behavior of the students were collected and analyzed. The pre- and post-nutrition learning models were analyzed by interview using a questionnaire. Data were statistically tested using paired t-test. Learning model that was developed was named *Model Pembelajaran Gizi Kontekstual*" or CTL (Contextual Teaching and Learning). **Results:** There was significant improvement in terms of nutritional knowledge and behavior of the students before and after introduction to a song titled *Kebiasaan Makanku* and to a flipchart themed *Mengenal Jenis dan Manfaat Makanan*". **Conclusions:** There is a need for nutrition education for elementary school teachers, especially for the fourth grade. Thus, teachers would have good knowledge on nutrition and therefore, they could use it to educate their students. Eventually, it would help implementation of CTL model.

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Effect of *Pulut* Corn and Long Heating on Energy Content and Sensory Acceptance of Wet Noodles

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Keywords: Corn flour · Wet noodles · Energy content · Organoleptic

Background/Aims: East Nusa Tenggara has various food sources, however, a considerable amount of food commodities have still to be distributed from other provinces, such as wheat flour. *Pulut* corn (*Zea mays* ceratina) is a type of corn whose starch contains 100% amylopectin. Amylopectin affects stickiness of food product; thus, it should be suitable to be produced into wet noodles. This research aimed to analyze the energy content and organoleptic characteristics of wet noodles. **Methods:** This experiment was conducted with completely randomized design, using three formulas: 75, 50, and 25% of *pulut* corn used in the wet noodles formula, with three replications. Data were analyzed with one-way ANOVA, with significant level at 0.05. **Results:** The more flour used in the experiment, the higher the energy content of the samples after five min of heating (p = 0.002). Inclusion of the corn (p = 0.276) and heating time (p = 0.212) did not significantly affect energy content; however, combination of both factors brought significant effect to energy content (p = 0.025). Organoleptic test showed that the sample with 75% corn flour and 25% wheat flour that was heated for five min was the most preferred one. **Conclusions:** Production of wet noodles with incorporation of corn flour could be offered as an alternative to reduce dependency on wheat flour by using local commodities.

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School Meal Program in Phnom Penh, Cambodia

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Keywords: School meal · Nutrition education · Cambodia

Background/Aims: School meal has many important roles, such as to fulfill the need for nutrition, improve students' cognitive skills, and prevent hunger and poverty. Cambodia nowadays is developing in many aspects including people's living standard and health indicators. On the other hand, adult obesity rate is increasing rapidly. Preliminary study found that meal intake and nutrition intake among children were not optimum yet. Therefore, school meal could possibly be a solution for preventing obesity by starting with eating habit in childhood. However, school meal program has not been clearly defined yet in Cambodia. Therefore, this study investigated school meal program in Phnom Penh, Cambodia. **Methods:** A cross-sectional study that was conducted using a questionnaire was carried out, with school directors of 50 public and 29 private schools in four districts in Phnom Penh were selected as the respondents, with a recovery rate of 59.5%. **Results:** Most of the respondents were familiar with the terms 'school meal' and 'nutrition education' by 90.9 and 97.8%, respectively. More private schools provided school meal than public schools. Public schools (71.4%) claimed that meal was available all day long at kiosks in their campus. On the other hand, private schools (85.7%) provided meal at lunch time at their own canteen. This result showed that term school meal had not been clearly defined and understood yet by all respondents. The respondents selected hygiene as the most important point of school meal program (62%), which was also interestingly the most concerned point in the meal program (42%). **Conclusions:** The term 'school meal' has not been clearly defined yet in Cambodia, though school directors showed keen interest in implementing the program at their schools.

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Strengthening Functional Food Product Development and Market in Indonesia: Opportunities and Challenges

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Keywords: Functional foods · Food marketing · Food innovation

Background/Aims: Many local foods in Indonesia could be classified as functional food. Increasing commercialization of local functional food not only could increase availability of healthy foods, but also improve economic status of local food producers. This study aimed to determine key factors in product development and marketing of local functional foods to make it successfully accepted in the market. **Methods:** This study was conducted by reviewing published literature on this topic. **Results:** There have been many research findings on local functional food, but studies on commercialization of local functional food are still scarce. Functional foods in Indonesia consist of products from local tubers, probiotics, dairy products, traditional herbs, and other food ingredients that contain bioactive substances and essential nutrients. There are many potential local functional foods that are recommended to be commercialized and they have been investigated by researchers. Consumers in Indonesia are increasingly aware of health issues, so that functional food market is predicted to keep growing. There are some challenges such as prototype of functional food research results that are not market-based, so that the product is not ready to be commercialized. Moreover, research findings about local functional food are mostly preliminary studies. Regulations on the sales of food with health claims remain unclear. **Conclusions:** It is important to improve product development and marketing strategy of local functional food in Indonesia.

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Development and Evaluation of Symbiotic Products for The Romanian Food Market

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Keywords: Synbiotics – Probiotic – Bacteria – Prebiotic – Whey – Functional Food – Romania

Background/Aims: The development of functional foods is a major concern for the food market, being considered one of the most effective methods of maintaining, improving and increasing consumer health. Nutraceuticals are functional foods containing probiotic microorganisms (bacteria and yeasts) with proven results in the prevention and treatment of diseases or having other positive effects on the consumers health. **Methods:** In the study, research was carried out to design and optimize the technological process of production of synbiotic products based on probiotic microorganisms developed on whey substrate and using three categories of prebiotics (inulin, lactulose, altodextrin). The research had two objectives, the superior valorisation of whey, a byproduct of milk industrialization and the production of symbiotic products, having physiological effects and superior stability compared to commercial food probiotics. **Results:** As final results, were obtained pulverized and lyophilized symbiotic products, which were evaluated physically, chemically and and for the probiotic microflora viability. The comparative study was conducted with probiotic products from pharmacies. The product specifications for the nutraceutical products have been developed. Research is useful from a theoretical and applicative point of view, laying the foundation for the development of new classes of probiotic products.

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Mother Empowerment on Child Nutrition Care 6–60 Months Through Mentoring an Effort to Prevent Child Malnutrition

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Keywords: Mother's empowerment – 6–60 months childcare – Mentoring – Risk factors

Background/Aims: Malnutrition in Indonesia in the last 20 years has not changed and has not yet been overcome properly. It shows that the overcoming of the emphasis on economic improvement, food intake and infection control has not been able to solve the problem properly. A new strategy is needed to prevent malnutrition properly. It must be able to overcome malnutrition to the root of the problem and at the same time overcome its' risk factors. The root problem of malnutrition in Indonesia was the mother's empower less on caring for her children's health and nutrition (p = 0.02). **Methods:** The experimental study in Surabaya aimed to empower mothers for nurturing their child's nutrition through mentoring according to their potential. A total of 39 women who had under five years old children were selected as the control group and 38 women were as trial group. On the control groups, Increasing the empowerment of mothers was done through counselling methods, while on trial groups was conducted tutorials, simulations, and skills training as an activity of mentoring. Multivariate ANOVA and t independent test were used to show the empowerment of mothers. **Results:** Mentoring based on nutritional care risk factors related to children's nutritional status could empower mother on their child nutritional care (p = 0.0001). It was needed 2 to 6 months for empowering a number of 7.1% – 17.7% of mothers with a mentoring. The minimum effectiveness of increasing knowledge during mentoring of empowering nutritional care was 2.5 and 3.1 times for the practice of nutritional care.

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Bannaris Bar: A Local Product as a Complementary Food for Emergency

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Keywords: Local food · Fortified · Emergency food

Background/Aims: People who live exactly on the 'ring of fire', frequently face emergency situation. The objective of this study was to develop potential local product that is rich in beta-carotene and fructo-oligosaccharide, suitable for emergency complementary food for children under five years old. **Methods:** Prototype of local food called *bannaris bar* was developed by using mix of local yam flour, local banana flour, and red bean flour, which is fortified by omega-3, omega-6, zinc, and iron. In 100 g of bannaris bar containing 440 kcal, 9.1 g protein, 21.1 g fat, 53.5 g carbohydrate, 805 RE beta-carotene, and 0.5 g fructo-oligosacharides. Efficacy of fortified bannaris bars on improving blood retinol serum, growth of gut probiotic, and consumers' nutritional status was assessed using a single blind randomized treatment with control group design. **Results:** The sample of bannaris bar had positive results in organoleptic test and it had 10 months of shelf life. Fortified bannaris bars were tested by 27 stunted children (2–5 year old) and there was significantly (p < 0.05) higher blood retinol serum concentration in treatment group as compared to control group. In control group, growth of *Bifidobacterium* sp in children's gut decreased significantly (p < 0.05), but it increased in the treatment group. Positive difference (delta z-score) was seen in nutritional status of the treatment group that was higher than that of the control group (0.06 vs. 0.02). **Conclusions:** Fortified bannaris bar could be used as a candidate for emergency complementary food for children during emergency situation.

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Development and Organoleptic Evaluation of Product from Amaranth Leaf Powder as a Low Cost, Nutrient Dense Snack for Vulnerable Population

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Keywords: Amaranth · Organoleptic · Innovative snack · Nutrition

Background/Aims: In India, amaranth leaves are used as a vegetable and its consumption could be optimized in dried form to develop innovative snacks. The study aimed to develop nutrient-dense snacks from amaranth leaf powder and evaluate their organoleptic properties over a storage period of 30 days. **Methods:** Three varieties of amaranthus (*Pusa lal chaulai*, *Pusa choti chaulai*, and *Pusa badi chaulai*) were processed into fine powder and stored in airtight plastic bags. For snack product preparations (i.e. Mathi, Biscuit, Matar, and Sev), wheat (WH-711), and chickpea (HC-5) flours were used, and dried amaranth leaf powders were incorporated at 5 and 10%. Ten panelists evaluated the snack sample for their color, appearance, flavor, taste, texture, and overall acceptance using a nine-point hedonic rating scale. For storage study, snacks were stored in glass jars for 30 days and they were organoleptically evaluated at every 15 days interval. **Results:** All snack samples with 5% leaf powder from the three varieties of amaranth were well accepted organoleptically, similar with samples with 10% incorporation of amaranth leaf powder (i.e. mean (SE) organoleptic score: Mathi, 7.20(0.13) vs. 6.60(0.16); Biscuit, 7.50(0.16) vs. 6.80(0.13); Matar, 7.60(0.16) vs. 6.70(0.15); and Sev, 7.50(0.16) vs. 6.70(0.26). Amongst the three amaranth varieties, snack sample made with *pusa lal chaulai* variety had the highest scores for all sensory characteristics. All snacks with 5% *Pusa lal chaulai* were moderately desirable (i.e. with organoleptic score of 7) up to 15 days. Among the different snacks developed using three varieties of powdered amaranth leaf, sample with 5% *Pusa lal chaulai* was organoleptically well accepted with a storage life of 15 days. **Conclusions:** Development of snack from powdered amaranth leaf could be a healthy alternative.

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Optimization of Extraction Conditions of Nutritional Mucilage from *Basella rubra*

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Keywords: Basella rubra – Mucilage – Extraction – Antioxidant activity – Phenolic compound

Background/Aims: The elderly have to deal with physiological and nutritional needs changes such as difficulty swallowing (dysphagia), constipation and antioxidant needs. *Basella rubra* is a herbal plant containing mucilage which is viscous and possesses antioxidant properties. Method: In this study, aqueous extraction was applied for nutritional mucilage extraction. Box-behnken design used for investigate the effect of three independent variables, namely *Basella rubra* powder to water ratio (1:10–1:30), extraction temperature (50–100oC) and extraction time (60 –120 minutes). Response surface methodology was employed to optimize the extraction conditions. The optimal extraction were 1:10 *Basella rubra* powder to water ratio at 50 oC for 90 minutes. **Results:** The mucilage had total phenolic content 38.77 ± 0.38 mg GAE/100 ml, 50.13 ± 1.67 % DPPH inhibition with viscosity 31.67 ± 1.36 cP. According to these results, the *Basella rubra* mucilage could be a new choice for applying in elderly products.

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Development of Bamboo Shoot with Yanang Juice Soup Cubes

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Keywords: Bamboo shoot – Tiliacora triandra – Soup cubes – Xanthine oxidase inhibition

Background/Aims: Bamboo shoot contains enzyme xanthine oxidase catalysing the oxidation of hypoxanthine to xanthine and then to uric acid, which involve in gout. The leaves of Tiliacora triandra or Yanang have been known to demonstrate antioxidant and xanthine oxidase inhibitory activities. This research aims at developing bamboo shoot with Yanang juice soup cubes as a new choice of healthy product. Method: The bamboo shoot(0.5x0.5 x5 cm3) was boiled for 10 minutes to reduced cyanide toxin. In order to inhibit xanthine oxidase and reduce uric acid, the bamboo shoot was heated at 95 oC for 30 minutes in Yanang juice. The xanthine oxidase inhibitory activity was 57.08% and uric acid was reduced from 2,441.73 to 275.97 µg/ml. The bamboo shoot was blended and dried by conventional dryer at 60oC for 3 hours. Dried bamboo shoot was mixed with concentrated Yanang juice, soy protein powder and others ingredients. The mixture was shaped and packed. **Results:** The product composition was varied including the amounts of Yanang juice (50–55%), dried bamboo shoot content (20–25%) and soy protein content (5–10%) by using mixture design. The suitable formula composed of Yanang juice 50.00%, dried bamboo shoot content 25.00%, glycerin 14.05%, soy protein 5%, garlic 2.14%, sugar 1.27%, pepper 1.27% and salt 1.27%. The cohesiveness of product was 3.76N. and L*a*b* color were 43.65, 2.33 and 21.26 respectively. Water activity was 0.847 and the viscosity of soup was 465.3 cP. Product composition included moisture content 52.80%, carbohydrate 38.68%, ash 5.38%, crude protein 4.27%, crude fat 0.17% and crude fiber 0.02%.

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Evaluation of Glycemic Indices of Biscuits Produced From Composite Flour of Fermented Soybeans, Unripe Plantain, and Carrot

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Keywords: Fermentation · Biscuit · Glycemic index

Background/Aims: The study developed and evaluated proximate composition, functional properties, anti nutrient characteristic, sensory parameters, microbial load, and glycemic index of biscuits produced from flour blend of fermented soybean, carrot, and unripe plantain. **Methods:** Soybeans seeds were fermented for 24, 36, 48, 60, and 72 h. **Results:** Fermentation significantly increased crude protein content of the samples (29.77% to 37.03%). Moisture content of the sample CARROT (25.23%) was significantly higher (p < 0.05) than that of the other samples. Crude fiber content of SOY72 (8.29%) was significantly lower (p < 0.05) than that of the other samples, while crude fiber content of CARROT (9.84%) was significantly higher (p < 0.05) than the content in other samples. Carbohydrate content of SOY72 (28.49%) was significantly higher (p < 0.05) than the other samples. Bulk density ranged from 0.38 to 0.54, while oil absorption capacity ranged from 0.32–0.74% with UNRIPE had the significantly highest value (0.73%). Water absorption capacity ranged between 9.13 to 17.27% and UNRIPE had the highest value of 17.27%. Emulsion capacity ranged from 4.22% in CARROT to 7.12% in UNRIPE and pH ranged from 6.42 in CARROT to 7.17 in SOY72. **Conclusions:** Biscuits produced from composite flour of fermented soybean, carrot, and unripe plantain could offer an alternative snack with healthy characteristics.

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Effect of Defatted Rice Bran Powder Supplementation on Blood Glucose and Lipid Profile in Overweight and Obese Adults with Hypercholesterolemia

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Keywords: Defatted rice bran · Hypercholesterolemia · Blood glucose · Lipid profile

Background/Aims: Defatted rice bran powder (DRB), a by-product of rice milling, is a rich source of dietary fiber, protein, and antioxidant compounds, which may help lowering blood glucose and lipid profiles. This study aimed to investigate the effects of DRB supplementation on blood glucose and lipid profiles of overweight and obese adults with hypercholesterolemia. **Methods:** Over a 12 week randomized control trial, overweight and obese participants aged 18 to 60 years with a total cholesterol (TC) level of >200 mg/dL were randomly assigned into two groups: control group (8 g/day starch, n = 18) and experimental group (30 g/day DRB, n = 21). Fasting blood glucose (FBG), HbA1c, TC, triglyceride (TG), LDL-c, and HDL-c concentrations were examined at 0, 6, and 12 weeks after intervention. **Results:** After 12 weeks DRB intervention, TC was significantly reduced by –13.6 ± 23.25 mg/dL (241.76 ± 38.83 to 228.1 ± 40.36 mg/dL, p = 0.038) compared to the baseline. Moreover, HbA1c was also decreased significantly by – 0.2 ± 0.28 % after 12 week DRB supplementation (5.91 ± 0.89, to5.71 ± 0.73%, p = 0.023). However, there were no significant changes in FBG, LDL-c, and HDL-c. Results demonstrated beneficial effects of 30 g/day of DRB supplementation on TC and HbA1c in overweight and obese adults with hypercholesterolemia. **Conclusions:** Supplementation of DRB might help lowering several important parameters in overweight and obese adults with hypercholesterolemia. These effects might be due to a delay in gastric emptying, interferences with intestinal absorption of cholesterol and glucose, and inhibition of digestive enzymes.

Track 5: Nutrition Epidemiology & Food Security

Oral Presentation

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Improving The Nutritional Status of Tea Farming Families in Indonesia

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Keywords: Agriculture nutrition · Tea farmers · Dietary diversity

Background/Aims: Business Watch Indonesia and Global Alliance for Improved Nutrition co-created the Nutrition Tea Project in Indonesia aimed to improve food and nutrition of 32,000 tea farmer families, living in 14 different tea producing districts in West and Central Java. The three sub-objectives of the program were: 1) to enhance the awareness of these tea farmer households regarding the importance of nutrition; 2) to increase the availability and accessibility of nutritious foods for these tea farmer households; and 3) to establish a support system for improving nutrition in these 14 districts. **Methods:** To measure the impact of the intervention, data on perception, production and consumption of foods was collected in two cross-sectional surveys among 252 female respondents at baseline and end-line. The number of respon-

dents cultivating vegetables increased from 19% at baseline to 72% at endline. **Results:** Growing fruits increased from 26% at baseline to 73% at endline and breeding animals increased from 28% to 72%. The Minimum Dietary Diversity for Women, defined as at least five of the ten food groups, increased significantly from 3 [IQR: 3;5] at baseline to 5.5 [IQR: 4;7] at endline. In cash crop value chains worldwide, the farmers that feed the world suffer from an inadequate diet themselves. The success of this intervention is in its simplicity. Farmers are familiar with cultivation of crops and know about the different types of foods. **Conclusion:** The concept of a diverse diet is easily understood and farmers are able to start their own home garden.

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Comparisons of Two Methods for Deriving Dietary Patterns in Association with Metabolic Syndrome among Middle-Aged and Elderly Adults with Impaired Kidney Function

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Keywords: Dietary pattern · Metabolic syndrome · Principal component analysis · Reduced rank regression

Background/Aims: Dietary intake is related to metabolic syndrome (MetS). MetS is commonly demonstrated in middle-aged and elderly adults with impaired kidney function. We aimed to investigate and compare the association between dietary patterns and MetS in middle-aged and elderly adults with impaired kidney function by using two methods to derive dietary patterns. **Methods:** The demographic, biochemical, and dietary data of middle-aged and elderly adults (n = 41,128) with estimated glomerular filtration rate (eGFR) less than 90 ml/min/1.73 m^2 and positive proteinuria were retrieved from a health screening database between 2008 and 2010 in Taiwan. Dietary patterns were identified by principal component analysis (PCA) and reduced-rank regression (RRR) model from 22 food groups using PROC FACTOR and PROC PLS methods, respectively, in SAS 9.4 program. **Results:** Participants with MetS were likely to be older, males, and had lower eGFR (71.5 ± 11.2 vs. 74.7 ± 9.2 ml/min/1.73 m^2 for MetS vs. non-MetS, P < 0.001). We identified relatively similar dietary patterns derived by PCA and RRR characterized by high intake of preserved/processed food, dipping sauce, meat, organ meats, fried rice/flour products, instant noodles, and eggs. The increased RRR pattern score was associated with a higher odds ratio (OR 1.61, 95% CI 1.48–1.75) of having MetS than the increased PCA pattern score (OR 1.31, 95% CI 1.20–1.42) after full adjustment. **Conclusion:** Our findings suggested that the RRR model provided a better association between dietary patterns and MetS in patients with impaired kidney function compared with the PCA method.

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Food Insecurity and Malnutrition among Temiar Indigenous Subtribe Children Living in Rural Malaysia

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Keywords: Food security · Children · Indigenous · Nutritional status

Background/Aims: Food insecurity is an underlying factor known to contribute to malnutrition in children. These problems remain high among indigenous groups living in remote areas of Malaysia. **Methods:** This cross-sectional study was conducted to determine prevalence of household food insecurity and to investigate the relationship between food security and nutritional status of children of Temiar subtribe. A total of 94 children (52 boys and 42 girls) aged 34.8 ± 15.5 months were recruited based on discharge list from two district hospitals. Anthropometric measurement was taken during home visit at 3 months following discharge from hospital treatment for malnutrition. Socio-demographic information was obtained from parents or guardian through face-to-face interviews. Food security was assessed using modified Malay version of Radimer/Cornell Hunger and Food Insecurity Instrument. **Results:** Based on WHO 2006 growth standards, 84% of children were underweight and 88% stunted. Following post-discharge of children who had achieved weight-for-height z-score of –1, 23 (24.4%) children were found have relapsed to z-score below –2. One child (4.3%) experienced household insecurity, 69.6% were individually insecure and 26.1% experienced child hunger. Among children (n = 71) who did not relapse, individually insecure was 7.0%, followed by household insecure 71.8% and child hunger 21.3%. There was no significant difference in levels of food insecurity between relapsed and non-relapsed group (p = 0.917). **Conclusion:** Food insecurity is still present among Temiar households with malnourished children. Therefore, food availability issues should be addressed through nutrition and economic programmes with involvement of important stakeholders to combat the consequences of food insecurity among indigenous children.

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Impact of Frying Conditions on Trans Fatty Acid Content and Oxidative Indices of The Oil Used for Preparing French-Fries

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Keywords: Trans fatty acid · Oxidative stability · Frying

Background/Aims: Frying process adversely affects oxidative stability and formation of trans fatty acids (TFAs) in fats/oils. The study aimed at assessing the effect of frying temperatures and

number of frying cycles on TFA and oxidative parameters of the oil used for preparing French-fries. **Methods:** TFA (using gas-chromatography) and other chemical indices (AOCS methods) were estimated at different temperatures (160ºC, 180ºC, 200ºC, 220ºC, 230ºC) and frying cycles (1st, 4th, 8th 16th and 32nd). Data were subjected to ANOVA analyses using SPSS.With elevating frying temperatures and successive frying cycles, mean saturated fatty acids and TFA increased while mean cis-unsaturated fatty acids concomitantly decreased. **Results:** Temperature variation during frying indicated increase in mean TFA from 0.13 ± 0.02 g/100 g (160°C; 32nd cycle) to 1.88 ± 0.04 g/100 g (230°C; 32nd cycle) (p < 0.05). With progressive frying cycles, TFA increased from 0.10 ± 0.01 g/100 g (1st cycle) to 0.13 ± 0.02 g/100 g (32nd cycle) when oil was heated to 160°C; and 1.16 ± 0.02 g/100 g (1st cycle) to 1.88 ± 0.04 g/100 g (32nd cycle) at 230°C. Acid value, p-anisidine value and TOTOX value demonstrated a significant increase at varying frying temperatures across the frying cycles (p < 0.05); however, peroxide value indicated inconsistency. TFA and oxidative indices increased with rising frying temperatures and progressive frying cycles; however, peroxide value revealed an inconsistent behaviour. Comprehensive novel data of the study will greatly help food-safety organisations in formulating stringent policies/food laws to curtail oil-abuse and minimise TFA formation. **Conclusion:** There is a dire need to raise consumer awareness regarding detrimental health effects of TFA and oxidative degradation of fats/oils.

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History of Diarrhea, Lack of Handwashing and Poverty are Determinants of Macro- and Micronutrient Deficiency among Women at Reproductive Age

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Keywords: Anemia · Chronic energy deficiency · Risk factor · Women at reproductive age

Background/Aims: Nutrition and health problem among women at reproductive age (WRA) may worsen the quality of the pregnancy resulting in children with poor human resource quality. This study aimed to identify risk factors of macro- and micronutrient deficiency (anemia and chronic energy deficiency/CED) among WRA (15–49 years old). **Methods:** A national survey of Basic Health Research conducted by National Institute of Health Research and Development, Ministry of Health of Indonesia collected data from 14,467 WRA. Data on mid-upper arm circumference as the indicator of macronutrient deficiency and haemoglobin level as indicator of micronutrient deficiency were collected by measurement, while the other variables were obtained from structured questionnaires. Acute respiratory infection (ARI) and pneumonia were assessed during the past month, while pulmonary tuberculosis was assessed during the past year. Data was analyzed using logistic regression test. **Results:** The prevalence of CED, anemia and CED+anemia was 19.1%, 19.4% and 4.7%, respectively. Younger age, history of ARI, high parity, slum resi-

dence, low education and poverty were risk factors of anemia, while younger age, history of pneumonia, history of pulmonary tuberculosis, high parity, lack of physical activity, work as labor and poverty were the risk factors of CED. Overall, the risk factors of CED+anemia were history of diarrhea (OR 3.8 95% CI 1.71–8.55 p = 0.001), younger age (OR 1.1 95% CI 1.02–1.18 p = 0.010), lack of handwashing after defecation (OR 3.1 95% CI 1.08–8.85 p = 0.036) and poverty (3.3 95% CI 1.17–9.17 p = 0.024). **Conclusion:** Economic status improvement together with nutrition and health education are necessary to prevent malnutrition problem among WRA.

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The Risk of Micronutrient Inadequacy among Wasting Children in Indonesia

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Keywords: Nutrition · Inadequate · Intake · Wasting

Background/Aims: Children under two need attention because of their vulnerability of nutrition inadequacy. It is well-known that 1000 first day of life is golden period of children. Inadequate intake which become indicator for inadequate nutrients intake could lead to growth and development failure. This report was part of the bigger study of randomized controlled trial of food supplement (fortified biscuit) intervention for wasting children. It aims to describe the risk micronutrient inadequacy among wasting children in Indonesia. **Methods:** The study was conducted in seven area of Indonesia. The sample size was calculated using two means comparison with 95% confidence level, 80% power and estimated difference of weight-for-length Z-score of 0,30. It involved 601 wasting children with age 6–17 month old. The intake was measured by 3-non consecutive days 24 hour recall (2 days weekday, 1 day weekend). **Results:** It is found that 36% of children were not met energy adequacy. It is found that 57% of children were in the risk of iron deficiency, while 50%, 56%, 0.75%, 0.68% were in the risk of zinc, Vitamin A, Vitamin C, and calcium deficiency respectively. Macronutrient intake of wasting children were not met Indonesian nutrition adequacy cut off. The children also in the risk multi micronutrition deficiency experience. **Conclusion:** Intervention using food Supplement with appropriate composition of macro-micro nutrient is needed, with the composition considers the age group, other condition such as psychological condition of the children.

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Low Maternal Vitamin D and Calcium Intake Status during Pregnancy among West Sumatran Population, Indonesia

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Keywords: Vitamin D intake · Calcium intake · Pregnancy · West Sumatra

Background/Aims: Vitamin D deficiency in pregnancy is high all over the world. Low availability of vitamin D and Calcium (Ca)-rich foods and poor healthy lifestyles may affect the adequacy intake in different regions. We investigated the association between lifestyles and place of residence with maternal vitamin D and Ca intake. **Methods:** This cross-sectional study was conducted with 203 pregnant mothers who lived in two districts of coastal and mountainous areas of West Sumatra, Indonesia. Lifestyles of mothers were assessed through a questionnaire. We examined dietary assessment during pregnancy by validated SQ-FFQ based on Minangkabau food culture. **Results:** The mean of maternal vitamin D and Ca intake was 7.92 ± 5.26 μg/day and 784.88 ± 409.77 mg/day, and there were no reports of vitamin D supplement intake during pregnancy. A total of 86.7% and 89.7% had low vitamin D and Ca intake status, respectively. There was a significant association between vitamin D intake status and place of residence (p = 0.02). The significant different mean levels between coastal and mountainous area were 9.04 vs 6.55 μg/day (p = 0.01). Mothers who have higher education levels had adequate calcium intake than low education levels (p = 0.015). **Conclusion:** Low vitamin D and Ca intake status were common in West Sumatera, Indonesia. Status of vitamin D and Ca intake may have differed with the place of residence.

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Education Level and High Maternal Motivation were The Risk Factors of Improper Appropriate Complementary Feeding Practices among Children Aged 6–23 Months: A Crossectional Study in Aceh, Indonesia

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Keywords: Knowledge · Attitude · Feeding practice · Survey · Children

Background/Aims: Poor knowledge, attitude and motivation of the mother determine complementary feeding (CF) practice of the child resulting in poor nutrition fulfillment. This study aimed to analyze maternal knowledge, attitude, motivation and their relationships with appropriate complementary feeding. **Methods:** Cross-sectional design data from 3 subdistrict in Aceh Besar District of Aceh Province Indonesia. Representative sample from 392 mothers of children aged 6–23 months in Aceh Besar District. Maternal knowledge, attitude and motivation were collected using valid and reliable structured questionnaire. Appropriate complementary feeding was assessed using foor indicators; minimum meal frequency, minimum dietary diversity, minimum acceptable diet and timely introduction to CF according to WHO recommendation, and socio-demographic. The association of maternal knowledge, attitude, motivation, and sociodemographic with Appropriate complementary feeding was analyzed using binary logistic regression at confident interval 95%. **Results:** There was the small prevalence of mothers having good knowledge, attitude, and motivation (20.2%, 8.7% 33.9%) respectively. Overall, there was one-fourth (23%) of the children aged 6–23 months receiving appropriate feeding practices. **Conclusion:** There were high correlations between maternal knowledge and attitude and between maternal knowledge and motivation. High education level and low maternal motivation were the risk factors of improper appropriate complementary feeding practice. Maternal knowledge, attitude, motivation and appropriate complementary feeding were still low. Therefore, an effort and a research to developing nutrition education model is warranted to improving knowledge and skill of mothers is important.

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Prevalence and Correlates of Vitamin D Deficiency Among Adults in Western Region of India

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Keywords: Vitamin D deficiency, Risk factors, Adults, India

Background/Aims The prevalence of vitamin-D deficiency (VDD) has been addressed in many studies covering all continents and having enormous public health consequences. Though VDD is highly prevalent in India, there is paucity of data about it among population in Western regions which receive ample sunlight round the year. Hence this cross-sectional study aimed at investigating the vitamin-D status and its associated risk factors in apparently healthy Indians from urban Vadodara in Gujarat state. **Methods:** About 129 subjects (age 30–60 years) from five zones of Vadodara were enrolled through snow-ball effect. After obtaining informed consent, a semi-structured questionnaire was used to capture demographic data and risk factors of VDD. Fasting blood samples were collected from the volunteer participants, and the serum was used to analyze vitamin-D by ELISA. 25(OH)D levels ≥75 nmol/L (≥30 ng/mL) were considered sufficient while levels <75 nmol/L were considered as insufficiency/deficiency. The data was subjected to appropriate statistical analysis using SPSS 20.

Results: The results revealed that almost 88% of the subjects had VDD, with significant high prevalence among females (p < 0.01). Percent body-fat, LDL-cholesterol and thyroid hormones-TSH & T3 showed significant negative correlation with the vitamin-D levels, while hemoglobin was positively correlated. These along with age emerged as significant predictors for the vitamin-D status in the multivariate regression model. Thus it was concluded that VDD was high among the population. So, there is a need to address the predictors for low vitamin-D status by adopting a healthy dietary pattern and an active lifestyle with adequate exposure to sunlight.

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Gender Difference in Background Factors Related to Obesity among Young Working Adults in Japan

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Keywords: Young adult · Gender differences · Obesity · Lifestyle habit

Background/Aims: To explore effective obesity control measures from their 20 s, we analyzed gender differences in factors related to obesity and weight gain in Japanese young adults. **Methods:** Cross-sectional data of male (M) and female (F) aged 20–34 years (M, 1,446 in 2013; F, 1,833 in 2014) were analyzed. The following four end-points were defined: Y1, high BMI (M≥25.0, F≥23.6 kg/m² [prevalence M/F: 30.0/15.3%]); Y2, weight gain in the past year (≥3 kg [23.3/12.4%]); Y3, weight gain after employment (≥5 kg [41.1/13.2%]); Y4, self-predicted body weight gain up to age 40 years (≥5 kg [34.6%/41.0%]. **Results:** Multiple logistic regression analyses revealed significant associations between Y1 and high fat meal (M/F, positive), walking speed (M/F, negative), amount of meal (M, positive), midnight snacking (M, negative), and bedtime (F, positive); Y2 and high fat meal (M/F, positive), fast eating (M, positive), habitual exercise (M, negative), dinner start time (F, positive), and physical activity (F, negative); Y3 and high fat meal (M/F, positive), fast eating (M, positive), habitual exercise (M, negative), and working time (F, positive); Y4 and high fat meal, amount of meal (M/F, positive), skipping breakfast (M, positive), physical activity (M, negative), late dinner (F, positive), habitual exercise, and sleeping time (F, negative). **Conclusion:** Health guidance and education should be provided to control obesity based on the common factors and gender differences observed in this study.

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Interaction Between rs174547 and Long Chain Polyunsaturated Fatty Acids on Metabolic Risk Factors of Cardiovascular Disease among Malaysian Vegetarians

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Keywords: Fatty acid desaturase · 1 gene linoleic acid · Alpha-linolenic acid · Vegetarians

Background/Aims: Imbalance ratio of linoleic acid (LA) and alpha-linolenic acid (ALA) interfere the endogenous synthesis of long-chain polyunsaturated fatty acids (LC-PUFAs) that control by fatty acid desaturase 1 (FADS1) gene, which may affect the metabolic risks profile of cardiovascular disease (CVD) among vegetarians. **Methods:** This cross-sectional study aimed to determine the interaction of LA and ALA with rs174547 in FADS1 gene on metabolic risk factors of CVD among 200 vegetarians in Kuala Lumpur and Selangor. The data on socio-demographic characteristics and vegetarianism practices were collected through a self-administered questionnaire. Three-day dietary recall was used to determine the LA and ALA intakes. Body weight, height, waist circumference (WC), and blood pressure (BP) were measured by the researchers. Overnight fasting blood samples were collected from the vegetarians for the blood lipid profile and genotyping analysis. **Results:** A majority of the vegetarians were lacto-ovo-vegetarians (48.0%), female (65.5%), and Chinese (63.0%). About two in five vegetarians (39.5%) had TT genotypes of rs174547. The rs174547 was significantly associated with body mass index (BMI), WC, fasting blood glucose (FBG), low-density lipoprotein cholesterol (LDL-c) and high-density lipoprotein cholesterol (HDL-c) (p < 0.05). Based on the interaction effect in two-way ANOVA analysis (p < 0.05), LA interacts with rs174547 to affect BMI, WC, TC, LDL-c, and HDL-c among vegetarians. **Conclusion:** In conclusion, TT genotype of rs174547 was associated with metabolic risk factors of CVD. LA affects the association between rs174547 and metabolic risk factors of CVD. Prospective studies are needed in the future in order to affirm the gene-diet interaction among Malaysian vegetarians.

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Relationship between Family Support, Peers, Food Patern, with Blood Sugar Levels in The Elderly

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Keywords: Family support · Peers · Food patern · Blood sugar levels · Elderly

Background/Aims: The prevalence of diabetes mellitus (DM) ≥15 years on the 2015 PERKENI consensus 10.9% (2018). The four main pillars in DM managing are meal planning, physical exercise, hypoglycemic efficacy drugs, and counseling. The success of DM managing requires active participation and role from both health

workers, sufferers, patient care, and from the social environment of patients including peers. Wanting a success in managing DM, researchers are interested in analyzing family support relationships, peers, food patern with blood sugar levels in the elderly. **Methods:** The research method used was an analytical survey with a cross sectional study design; the sampling method was purposive sampling, amounting to 200 people. **Results:** The results show that the prevalence of diabetes-related behavior, gender and history of hyperglycemia are factors that influence diabetes behavior scores. The frequency of metabolic syndrome is 63.9% due to low High Density Level Cholesterol, that comes from a high energy and fiber but low fat intake. Elderly people who get care from peers can reduce the cost of hospital care because patients recover quickly. **Conclusion:** The conclusion is that there is a significant relationship between family support, peers, food patern with blood sugar levels in the elderly.

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Knowledge About Anemia and Iron Supplementation of Indonesian School Girls: Results of a Baseline Survey

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Keywords: Anaemia · WIFA supplementation · Knowledge · School girls

Background/Aims: The Nutrition International is working with the UKS/M program to strengthen the delivery of WIFAS and nutrition education to adolescent girls in Indonesia. The objective of this study was to assess the baseline knowledge of school girls regarding anaemia and IFA supplementation in East Java, East Nusa Tenggara, and a comparison area of South Sulawesi provinces. **Methods:** The study sampling included 10 districts from each of the provinces, in which 3 high schools were selected; 30 school girls were selected per school, with a total of 900 school girls. Data were collected using self-administered pre-tested questionnaires containing 18 items. The knowledge level was determined based on the score of a scale from 0 to 100 and was classified as high (>80), moderate (60–80) and low (<60). **Results:** The knowledge levels among the three provinces was not statistically different. Almost all (98%) school girls' level of knowledge were in low category, and no one was categorized in the high category. About 40.5% of school girls knew that iron deficiency can cause anaemia, while 50.9% stated that anaemia is caused by lack of sleep. About 30% of school girls had never heard about IFA supplementation; 25.2% did not know about its benefits, and 73.1% did not know the dosage and duration of IFA supplement. **Conclusion:** The awareness of school girls still needs to be improved. It is suggested to integrate these topics into nutrition education through the school curriculum, and be disseminated through various media and communication channels accessible to school.

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New Data for Vitamin D3, 25-Hydroxyvitamin D3, Vitamin D2 and 25-Hydroxyvitamin D2 Content in Australian Camel, Crocodile, Emu and Kangaroo

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Keywords: Vitamin D · Game meat · Food composition data

Background/Aims: Nearly 40% of Australian Aboriginal and Torres Strait Islander (Indigenous Australian) adults living in remote communities are vitamin D deficient. Hunted and foraged foods (bush tucker) contribute up to half the daily food intakes of some remote-dwelling Indigenous Australians; however, the vitamin D content of bush tucker is unknown. **Methods:** We quantified vitamin D3, 25-hydroxyvitamin D3 (25(OH)D3), vitamin D2 and 25-hydroxyvitamin D2 (25(OH)D2) in raw camel, crocodile, emu and kangaroo meat using liquid chromatography-triple quadrupole mass spectrometry. We detected vitamin D3 and 25(OH)D3 in camel, crocodile and emu meat. **Results:** The greatest concentration of vitamin D3 was found in emu (0.78–3.73 µg/100 g, depending on cut); camel had the highest content of 25(OH)D3 (0.68–5.17 µg/100 g). Vitamin D2 was detected in emu (0.08–0.24 µg/100 g) and kangaroo (0.06–0.16 µg/100 g). Small amounts of 25(OH)D2 were detected in camel (0.05–0.24 µg/100 g) and kangaroo (0.04–0.11 µg/100 g). On the assumption that 25(OH)D is five times more bioactive than vitamin D, total vitamin D ranged between 3.65–27.29, 0.69–1.48, 1.23–4.73 and 0.20–0.68 µg/100 g in various cuts of raw camel, crocodile, emu and kangaroo meat, respectively. One serve (90–100 g) of raw diced camel meat may provide approximately 85% of the daily vitamin D requirement (15 µg) of people aged 1–70 years. **Conclusion:** These findings support the analysis of a broader range of Australian bush tucker to identify good sources of vitamin D. This will allow the development of dietary strategies to promote vitamin D sufficiency in Indigenous Australian people living in remote regions of Australia.

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Nutritional Impact of Plate Waste in University Canteens: An Assessment at Mulawarman University, Indonesia

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Keywords: Plate waste · Nutrient Food service · Canteen
Background/Aims: Food loss and food waste have become a global burden on food security and sustainability of food system, especially in under-developed and developing countries of which some population groups are vulnerable to hunger and malnutrition. Plate waste is a major part of food waste generated from institutional food service. This study determined the amount, composition and nutritional impact of plate waste generated in canteens of Mulawarman Universirty, Indonesia. **Methods:** Sixteen out of 34 vendors throughout the campus were purposively included to represent all types of food and serving styles. The study was conducted for 5 consecutive full-service days in September-October 2017. Plate waste was collected and quantified according to the Food Loss and Waste Protocol of the United Nations Environment Programme. Samples of plate waste from each vendor were also collected for proximate composition analysis. **Results:** During the study, 4,070 portions of food were sold by the participated vendors. On average, 39.22 g of food was left uneaten on each plate, accounting for about 10% of the serving portion weight. Staple food was the most wasted food category, followed by fruits and vegetables, and cereals and legumes. Proximate composition of plate waste was 50.22% carbohydrate, 10.47% protein, 9.45% fat and 7.44% ash on a wet weight basis. **Conclusion:** Based on the calculation, caloric loss due to plate waste was 128.25 kcal/portion and the estimated calories left uneaten on plate universitywide was 222,385 kcal/day which was sufficient to fulfill daily energy requirement of 111 adults.

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Prevalence of Stunting among Malaysian Infants Aged 6 Months and Its Associated Factors

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Keywords: Infants · Growth faltering · Stunting · Malaysia
Background/Aims: Stunting issues in childhood has been identified as a major form of undernutrition globally and can adversely affect health in later adulthood. In Malaysia, about 20.7% of children under five were stunted whereas 15.5% of its prevalence were among children aged 6–11 months. Therefore, this study aimed to assess the prevalence of stunting among infants aged 6 months and its associated factors. **Methods:** This study is part of the Mother and Infant Cohort Study (MICOS) which was conducted at six selected government Maternal and Child Health clinics in the state of Selangor and Kuala Lumpur. In this study, a total of 230 mothers completed the data on socio-demographic factors, obstetrical factors and birth-outcome factors through face-to-face interviews. Anthropometry data were extracted from their medical records. Length-for-age (z-score) (LAZ) of the infants were compared with the WHO Growth Standard (2006). **Results:** The prevalence of stunting among infants aged 6 months was 10.4%, with a mean LAZ of –0.64 ± 1.21. Based on the multiple linear regression analysis, female, non-Malay infant, those with high birth length and weight, mother with high pre-pregnancy body mass index (BMI) and primigravida were significantly contributed toward high LAZ of infants at 6-month old (p < 0.05). **Conclusion:** In short, one in ten of the infants were stunted. This study revealed that maternal factors including pre-pregnancy BMI and gravidity, and infants' factors including birth length and weight, sex, and ethnicity were contributing factors of stunting. Therefore, early interventions are needed to have a better linear growth among infants.

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Health and Nutritional Situation of Rural Children Coming from Poor Household in Pandegelang District, Banten Province, Indonesia

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Keywords: Undernourishment · Stunting · Women's education · Banten province
Background/Aims: Undernourishment is correlated with food insecurity caused by low income and limited access to nutritious food, low education level and hygiene practice which cause the disease. The study intended to assess determinant factors of stunting among children from poor households for providing an appropriate handling to overcome the undernourishment among children under five. **Methods:** Pandeglang district was selected as the study area due to its high prevalence of undernourished children in 2013. The oldest under-five children from poor household (income below the UMR/Minimum Standard of Salary in Banten province) were selected. Data on general characteristics, anthropometry of the children, as well as household socio-economics, including 24 hours recall were obtained. **Results:** The results presented that of 105 children, 40% of them were stunted. Poor hygienic practices of the women were found in the study area indicated by low proportion (< 25%) of washing hands, except before eating. Respiratory infection was dominated the disease prevalence among children in the last two weeks, followed by diarrhea 21.9%. Maternal education more than junior high school was found to have significantly more non-stunted children (p = 0.026) children in poor household in

Pandegelang Banten. **Conclusion:** Our study showed the importance of an investment on women's education for providing a better care for their children to improve their child's health nutritional status.

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The Effectiveness of Saving Time Kluwek Seed Extract (*Pangium edule. Reinw*) That Is Aplicatied of Tuna Fish (*Thunnus sp*) Natural Control Material from Indonesia Spice

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Keywords: Kluwek Seeds · Natural preservatives · Antimicrobials

Background/Aims: The efforts are to increase and maintain the high fish production of the fish freshness. One of the technology is called preserving fish. To know the effect of shelf life of the most effective kluwek seed extract in inhibiting microbial growth and examining the differences between the quality of tuna fish and kluwek seed extract compared to tuna. **Methods:** This study used experimental research design using control and treatment groups with variations in concentration and shelf life. Data Collection Techniques consisted of Sorting, Stripping, Processing, Preliminary Treatment of Tuna and Treatment of Variation Concentration of Kluwek Seed Extract and fermentation time. Data were analyzed using ANOVA and DMRT.Analysis of ANOVA test at 0 and 6 hours was most effective inhibiting microbial growth in tuna. **Results:** Shown by the average results of 0th hour which was 10.94 x 105 and 6th hour, namely 19.91 x 106. It showed the results are significantly different. The longer of shelf life of tuna, the more the number of microbes live. The average texture of tuna fish was treated with kluwek extract at 0 o'clock that was produced the highest texture yield, that was solid and chewy. It because the condition of the fish was still fresh. While 6th hour of the tuna fish texture produced lower than 0th hour and 12th hour that was slightly soft and slimy. **Conclusion:** The most effective shelf life at 6th hour and the results of observations on the texture indicator for the shelf life at 0, 6 and 12 hours.

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The Interaction between Cdx2 Polymorphism of Vitamin D Receptor and Calcium Intake on Peak Bone Mass in Young Japanese Women

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Keywords: Peak bone mass · Vitamin D polymorphism · Calcium intake

Background/Aims: Peak bone mass associates with many factors, such as physical activity, diet, and genetics. Although the effect of Cdx2 polymorphism of vitamin D receptor (VDR) on peak bone mass has been investigated in several countries, it isn't still well studied in Japan. Furthermore, few studies have focused on the interaction of Cdx2 polymorphism and calcium intake on peak bone mass. Therefore, the aim of this study was to investigate how peak bone mass is influenced by Cdx2 polymorphism and the interaction of Cdx2 polymorphism with daily calcium intake in young Japanese women. **Methods:** The subjects were female college students aged 20 to 24 years (n = 477). As an index of peak bone mass, osteo sono-assessment index (OSI) was measured using qualitative ultrasound. The subjects were asked the age at menarche and physical activity habits. Nutrient intake was estimated using the Food Frequency Questionnaire Based on Food Groups (FFQg). The subjects were grouped according to their daily calcium intake (mg/1,000 kcal). Cdx2 polymorphism of VDR was determined by real-time PCR. 407 subjects were analyzed after exclusion according to the criteria. **Results:** There was no significant difference in OSI between Cdx2 polymorphism. However, a significant relationship between daily calcium intake and OSI was found in the subjects having GG genotype of Cdx2 (p < 0.05), although p values were changed when adjusted for covariates. **Conclusion:** Our study suggests high intake of calcium may increase peak bone mass in young Japanese women having GG genotype of Cdx2.

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Associations of Rice and Wheat Supply with Suicide and Major Depression: An International Comparative Study

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Keywords: Rice and wheat · Major depression · Suicide · Global statistics

Background/Aims: Suicide is the second leading cause of death among 15–29 year olds globally. A major cause of suicide is depression. Tryptophan and carbohydrate-rich foods are necessary for the production of serotonin in the brain that promote the feeling of well-being. The purpose of this research is to clarify the longitudinal association of rice and wheat with major depression and suicide rate using worldwide statistics. **Methods:** The prevalence of major depression and the rate of suicide data by countries were derived from the Global Burden of Disease (GBD) 2017 database. Average of rice and wheat supply (g/day/capita) by countries, excluding loss between production and household, were obtained

from the Food and Agriculture Organization of the United Nations Statistics Division database. Data from 136 countries over 20 years with no missing values in covariates were analyzed by the linear mixed-effect models. **Results:** The rice supply was significantly negatively associated with the prevalence of major depression (β = −0.251 ± 0.118, p = 0.033) and the rate of suicide (β = −0.009 ± 0.003, p < 0.001). On the other hand, wheat supply was not associated with major depression (β = −0.043 ± 0.071, p = 0.540) and suicide (β = 0.002 ± 0.002, p = 0.124). **Conclusion:** Although rice and wheat have the same source of carbohydrate, rice was associated with prevalence of major depression and rate of suicide, while wheat were not associated with major depression and suicide after controlling for socioeconomic indicators.

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Assessment of Vitamin D3 Levels and Markers of Obesity Among a Female University Student Population in Sri Lanka

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Keywords : Vitamin D, Obesity

Background/Aims: Vitamin D relates not only with musculoskeletal health, but also with non-communicable diseases. According to literature, teenagers and young women are at risk of being vitamin D deficient and later in life development of numerous chronic health conditions. Thus, the objectives of the current study were to assess the level of vitamin D3 levels of a group of female university students and to study the association between vitamin D3 levels and markers of obesity [waist circumference (WC), body mass index (BMI), Body fat percentage (BF%) and Visceral fat level (VF)]. **Methods:** Ten hour fasting blood samples were collected in 50 subjects and serum vitamin D3 levels were assessed using Mini-Vidas immune analyzer. Anthropometric measurements were taken using World Health Organization guidelines. Body fat levels were assed using Omron body fat analyzer. **Results :** Mean age of the current population was 23 (±2) years. Mean vitamin D level was 18.8 (±5.5) ng/L. Based on Institute of Health guidelines, 31 subjects (60.8%) belonged to the inadequate category (10–20 ng/L) and 19 subjects (37.3%) had sufficient vitamin D levels (>20 ng/L). The mean WC, BMI, BF%, VF were 78.8 cm (±9.3), 22.0 kg/m^{-2} (±3.1), 32.0% (±4.1), and 3.9 (±2.9) respectively and were within normal ranges. Each measure of body fat distribution had weak association with serum vitamin D levels (P = 0.05). Although the mean values of the current population do not belong to risk category of being obese or overweight, majority showed inadequate levels of vitamin D which can lead to future chronic health implications.

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CSIRO Healthy Diet Score: A Short Online Survey to Measure Compliance with Food-Based Dietary Guidelines

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Keywords: Dietary assessment · Diet quality · Population monitoring · Dietary guidelines

Background/Aims: Policy makers recognise the complexity of dietary intake, and increasingly composite indexes are used to assess diet quality. Despite advances in technology dietary assessment remains a challenge, particularly in large population studies. **Methods:** The Commonwealth Scientific and Industrial Research Organisation (CSIRO) Healthy Diet Score survey asks questions about the quantity, quality, and variety of foods consumed. On completion, individuals receive a personalised diet quality score (reflecting compliance with the food-based Australian Dietary Guidelines) and prioritised short messaging about what should be improved. The online survey was launched in May 2015, and each year between 18,000 and 85,000 Australians have completed the survey (total of 216,045 unique completers). **Results:** The average Diet Score was 58.6(SD = 13.0) out of a possible 100. Women score higher than men; older adults higher than younger adults; and normal weight adults higher than obese adults. The three poorest performing areas of Australians' diets are discretionary/"junk" foods, dairy and choosing healthy fats with 73.8%, 56.1% and 47.7% of the sample respectively receiving advice on how to improve their diets around these Guidelines. The combination of accessible technology and providing the tool free of charge are factors leading to high usage, providing valuable insights into what Australians' report to be eating. **Conclusion:** This survey is useful to monitor how diets comply with dietary guidelines. The similarities in food-based guidelines suggests, that with appropriate modifications, this online survey could be an innovative and feasible approach to collecting comparable dietary intake data across countries such as those in the South East Asia and Oceania region.

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Zinc Levels in Type 2 Diabetes Melitus: A Preliminary Study of Diabetic Nephropathy Progressivity

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Keywords: Zinc · Type 2 diabetes mellitus · Microalbuminuria · Diabetic

Background/Aims: Zinc is one of the micromineral which involved in carbohydrate metabolism. Some studies found there are

zinc levels alteration in Type 2 Diabetes Mellitus (T2DM) individuals, in which zinc leves are decreased further if diabetic nephropathy occur. Diabetic Nephropathy is a complication of DM, which characterized by the presence of microalbuminuria (MA). **Methods:** In this cross-sectional study, serum zinc levels and MA were measured and then compared between three groups (control group, T2DM with hypertension, and T2DM without hypertension) to find out whether there are differences in Zinc level within those groups. Zinc serum were measured using ELISA method, while MA used Immunoturbidimetry method. **Results:** 42 samples were collected, consist of 15 subjects in control group, 11 in T2DM with hypertension, and 16 in T2DM without hypertension. The urine albumin/creatinine ratio was higher in T2DM group compared to the controls (p = 0.001), but the serum zinc levels between control group and T2DM (p = 0.276) show no significancy. There were significant differences in albumin/creatinine ratio (p = 0.002) and serum zinc (p = 0.041) between T2DM with hypertension compared to other two groups, and there was no association between serum zinc levels in T2DM with MA positive and T2DM with MA negative (p = 0.889). **Conclusion:** We concluded that zinc levels in T2DM with MA positive are lower than T2DM with MA negative, although there was no significant correlation. This is an ongoing preliminary study.

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Diversification of Household Food Consumption and Its Implications for The Development of Agricultural Commodities

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Keywords: Diversification · Food consumption · Class income · Urban-rural

Background/Aims: This paper aims to understand the dynamics of diversification of household food consumption and its implications for future agricultural commodity development policies. **Methods:** Data Susenas 2002 and 2014 from Central Agency of Statistic (BPS) was analyzed at national level and disaggregated by regions (urban and rural) as well as income groups (low-middle-high). The diversification level of food consumption was analyzed using the Entropy index measurement method. **Results:** The result showed that in the period of 2002–2014 diversification of all type of food consumption increased, and found higher in rural and low-income households than in other groups. Moreover, the diversification in each food group consumptions varied: (1) diversification of vegetables and processed foods consumptions increased in all household regions and income classes; (2) diversification of fruit consumption increased in urban, middle- and high-income households; (3) diversification of carbohydrate and plant-based protein consumptions decreased in all household groups; (4) diversification of animal-based protein sources consumption decreased in urban, middle- and high-income households. **Conclusion:** These results reveal the importance of production and food availability to not only focus on increasing carbohydrate and plant-based protein sources (rice, corn, soybeans) productions,

but also on other commodities to meet the household consumption patterns. The productions sholud be adjusted to the potential availability of land and existing cropping patterns in each region as well as to support local food-based products.

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Association between Nutritional Status, Food Intake and Frailty among Community Dwelling Older Adults in Malaysia

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Keywords: Elderly · Nutritional status · Food intake · Frailty

Background/Aims: Ageing can affect nutritional status and food intake, thus relates to frailty which increases the risk of poor health outcomes. **Methods:** A cross-sectional study was carried out to determine the association between nutritional status, food intake and frailty among community-dwelling elderly in Selangor, Malaysia. Subjects age 60 years and above were selected through a random sampling method and were interviewed for sociodemographic, health status, depression through geriatric depression scale (GDS-15), functional status from Instrumental Activities of Daily Living (IADL) questionnaire and structured dietary history questionnaire (DHQ). In addition, anthropometric measurements and frailty assessments based on Fried's criteria were also performed. **Results:** A total of 171 elderly (mean age 73 ± 6 years) participated in this study. Majority of the subjects (80.1%) were abdominal obesity. 42.1% of the total subjects had normal weight, 40.9% overweight, 13.5% obese and 3.5% underweight. The mean energy intake was 1398 ± 303 kcal. Most of the subjects have a good functional ability. However, 69.6% of the subjects were classified as frail, followed by pre-frail (30.4%). IADL score was significantly higher among pre-frail compared to frail elderly (p < 0.05). Pre-frail and frail elderly were differed in weight, body mass index and percentage of total body water. The intake of potassium and niacin were differed between pre-frail and frail elderly (p < 0.05). **Conclusion:** Poor nutritional status and food intake can contribute to frailty among the elderly. Earlier assessment on nutritional status and food intake could be useful in the prevention of frailty among elderly.

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Dyslipidemia in Apparently Healthy Obese Adults Residing in New Delhi

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Keywords: Adults · BMI · Dyslipidemia ·Obesity · Prevalence

Background/Aims: Obesity and Dyslipidemia are the major risk factors for developing cardiovascular and related diseases. The objective of the study was to determine the prevalence and pattern of dyslipidemia in apparently healthy urban obese adults residing in New Delhi. **Methods:** A cross-sectional study was conducted among apparently healthy obese adults (BMI≥25 kg/m²) aged 35–50 years. Data related to age, sex, anthropometric measures, and indices were gathered. Fasting blood samples were collected to determine serum lipid levels. Dyslipidemia signifies the increased concentration of total cholesterol and LDL cholesterol, hypertriglyceridemia and decreased concentration of HDL cholesterol present alone or in combination. **Results:** A total of 150 apparently healthy obese adults were recruited (80 men and 70 women) with a mean age of 41.36 ± 4.75 years. Prevalence of dyslipidemia was reported to be 78% in the study subjects. The prevalence of elevated total cholesterol (TC), triglycerides (TGs), low high-density lipoprotein cholesterol (HDL -C) and low-density lipoprotein cholesterol (LDL -C) was 12.66%, 49%, 52.66%, and 39.33% respectively. Mean TG levels were significantly higher in the obese male subjects when compared with female subjects, however, HDL –C levels were significantly higher in the female subjects (@ p < 0.05). **Conclusion:** Low HDL was the most common form of dyslipidemia followed by high TGs in obese adults. Timely screening and adequate medical and dietary intervention can help in controlling and preventing further health-related complications.

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Food Habits and Patterns of Protein Consumption in Indonesia

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Keywords:
Food habit · Protein consumption · Nutrition transition · Food cultures

Background/Aims: Nutrition transition describes people's dietary changes, and is determined among others by economic factors and eating cultures. This paper aimed to assess the association between eating-habits and protein consumption pattern to understand the transition in Indonesia. **Methods:** It is derived from the "Socio Cultural Research on Protein Transition (SCRIPT)", conducted cross-sectionally among adult male/female aged≥19-years (n = 1728) in 6 most-populated Indonesian provinces during February-April 2018. Eating habit was limited to food-event number, cooking/buying for meals and meals-out-of-home. Protein consumption was assessed using Food Frequency Questionnaire. The pattern was categorized as monthly-animal and -plant protein-consumption-frequency (APF and PPF), and 3 patterns derived from principal component analysis (PCA), i.e. Plant-based-food-pattern (P1), Chicken-Maized-based-food-pattern (P2) and "jajanan"-pattern (P3). Food-event number was not different by urban/rural. **Results:** Cooking was significantly higher in rural, while eating out was in urban area. Animal-protein-consumption-frequency (APF) was higher in urban; while plant-protein-consumption-frequency (PPF) was in rural area. P1 score was higher in rural and P2 and P3 score in urban area. APF, PPF, P1 and P2 score was significantly higher at higher food-event-number. Cooking was associated with lower PPF, higher P1 and lower P2 and P3 score. APF and PPF was not different by eating-out habit, but eating-out during lunch was associated with higher P2 and P3 score, and dinner at home with higher P1 score. **Conclusion:** The analysis implied that shifting of eating-habit toward more non-traditional pattern may lead to transition of food consumption pattern, for protein in particular. Dealing with dietary transition needs to consider eating habit

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Dietary and Physical Activity Perceptions of Obese Housewives

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Keywords: Diet · Housewifes · Obesity · Perceptions · Physical activities

Background/Aims: Obesity is one of the major public health concerns in Sri Lanka. Nearly 25% of adults are obese and the majority represents the middle aged women. In the absence of studies on perceptions on obesity and obesity management via diet and physical activities, current study was conducted with the objective of assessing the dietary and physical activity perceptions of obese housewives. **Methods:** A descriptive qualitative study conducted using 30 individual interviews. Interviews were steered with purposely selected obese housewives aged 25–50 years living in Pannala area. All the interviews were conducted in participants' native language and transcribed verbatim. Data were analyzed using Nvivo software and themes and subthemes were derived. **Results:** As stated by the participants, only 23% of them were aware about their obesity condition. Genetics, surgeries, birth control methods, multiple pregnancies and unhealthy diet were the perceived causes of obesity. Majority believed that diet (83%) and physical activity (86%) has an impact on obesity. Perceived barriers for obesity management were lack of time, lack of motivation and less interest. Inconvenience in continuing a diet plan, impact of family members, limited time to do exercises, less interest in losing body weight and physical inconveniences following the exercises were the barriers related to dietary management and engaged in physical activities. **Conclusion:** Findings of the current studies highlighted

the lack of awareness about their current obesity condition, role of diet and physical activities on obesity management thus urge of initiating awareness and education programmes is emphasized.

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Prevalence of Self-Reported Food Allergy among Chinese Children Under 6 Years in 2013

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Keywords: Food allergy · Allergen · China · Children · Under 6 years · Under 2 years

Background/Aims: Background and Objectives: To investigate the national-wide prevalence of food allergy among Chinese children under 6 years. **Methods:** A cross-sectional study was conducted on food allergy among children under 6 years of age (n = 34367), who were sampled from 55 counties in 30 provinces in 2013 Chinese Nutrition and Health Surveillance (CNHS) by stratified multistage cluster sampling methodology. **Results:** The weighted prevalence of self-reported food allergy among children aged 0~23 months and aged 2~5 years was 3.51% and 4.01%, respectively. Significant difference existed in each age group between urban and rural areas (5.81% vs.1.59%, x2 = 120.40, P < 0.001; 5.78% vs.2.56%, x2 = 82.99, P < 0.001). Yet no difference was detected between genders (3.59% vs.3.41%, x2 = 0.21, P = 0.64; 4.19% vs.3.81%, x2 = 1.22, P = 0.27). **Conclusion:** Eggs, shrimp and fish were the top 3 allergic food varieties in downward order for the younger group, whereas shrimp, crabs and eggs were the most allergic ones for the older. The prevalence of self-reported food allergy among Chinese children under 6 years was 3.5%~4.0%, being significantly higher in urban areas than rural. Caution is needed when these allergic foods are supplied to young children.

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Intake of Salt/Umami/Fat and Sweet/Fat Tasting Foods are Associated with Cardiovascular Disease (CVD) Mortality in Dutch Elderly Cardiac Patients

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Keywords: Taste · CVD · Prospective cohort study · Mortality

Background/Aims: Taste preferences have been associated with dietary behavior and risk factors of CVD. No studies investigated the association of actual food intake from taste-specific food groups with cardiovascular disease (CVD) mortality. Our objective was to study the association between taste-related food intake and CVD mortality in well-treated Dutch cardiac patients in the Alpha Omega Cohort Study. **Methods:**We included 4,365 patients aged 60–80 years. A Food Frequency Questionnaire (FFQ) was administered at baseline. Cause-specific mortality was monitored from 2002 until January 2013. The dietary intake data was combined with a taste database, containing 476 foods. We performed cluster analysis on the foods consumed by patients and came to 6 taste clusters. Food intake (g) was calculated for each taste cluster. HRs for CVD mortality were obtained from Cox Proportional Hazards Model adjusting for age, sex, total energy intake, physical activity, educational level, smoking status, alcohol use, medication use, and intake from other taste clusters (g). **Results:** During a median follow up time of 7.3 years, 310 patients died due to CVD. A high intake of salt/umami/fat tasting foods increased the risk of CVD mortality with an HR of 1.53 (95% CI: 1.06, 2.16; p-trend = 0.017), while a high intake of sweet/fat tasting foods decreased the risk of CVD mortality, with an HR of 0.61 (95% CI: 0.42, 0.88; p-trend = 0.015). **Conclusion:** Bitter, sweet/sour, neutral, and fat tasting food intakes were not significantly associated with CVD mortality. This study implies that taste of foods should be taken into account when studying predictors for risk of CVD mortality.

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Pathway Analysis of Growth Faltering Pattern Based on Height for Age in Children Under Five in Indonesia Based on Indonesian National Health Survey 2013

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Keywords: Growth failure pathway · Pathway · Children under five years · Indonesia

Background/Aims: Growth failure has a severe impact on public health problems. Stunting was a growth failure type based on height for age that has a serious impact on child mortality and morbidity of non-communicable disease in adults. Objective: To analyze the determinants of growth failure pattern in children under five years in Indonesia. **Methods:** The further analysis was taken from 6020 samples of children under five years, based on the Indonesian National Health Survey (Riskesdas) 2013 (cross-sectional survey with a multi-stage cluster sampling method). Inclusion criteria were data that has complete records. The exclusion criteria were data that have ≠0 flag values. Nutritional status was analyzed by WHO AnthroPlus 2009. Data analysis was taken by path analysis in SPSS 21. **Results:** The growth curve height for ages in children under five years in Indonesia less than WHO growth standard. The mean of height for age z-score (HAZ) has declined in linear pattern among first five years age of life. The determinant of growth divides in two age group. Socioeconomic has an indirect effect in both adjusted by age and sex. In children <36 months, body mass index (BMI) of the mother has a direct and indirect effect, while low birth weight, breastfeeding status, infectious disease, and immunization was a direct factor to HAZ score. In children on 37–59 month, the infectious disease was a direct factor. **Conclusion:** Socioeconomic, BMI of a mother, breastfeeding status, immunization, and infectious disease was a determinant of growth failure pattern in Indonesia.

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Antibacterial Activity of Pectin Isolated from Durian Rinds

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Keywords: Antibacterialdurian · Pectin · Polysaccharide gel
Background/Aims: Currently, consumers demand more natural foods. This trend has increased the research to evaluate plants extract as an alternative preservative to the usually used synthetic ones. Polysaccharide gel extracted from Monthong durian rinds had been studied to possess antibacterial activity. The purpose of this study is to characterize the polysaccharide gel extracted from local durian rinds and compare its antibacterial activity against Escherichia coli and Staphylococcus aureus to commercial citrus peel pectin. **Methods:** Gel extraction had been conducted and yielded an average of 3.99% dried polysaccharide gel per weight of grounded dried durian rind (% w/w). **Results:** The FTIR analysis showed a typical polysaccharide spectra and concluded the gel as pectin substances. The pectin extracted had a degree of esterification approximately $26.50 \pm 1.89\%$. The antibacterial microdilution assay showed that commercial pectin and pectin extracted from durian rinds inhibited the growth of bacteria (minimal inhibitory concentration at 12.5%) but had no bactericidal effect. Commercial pectin and the wet gel inhibited the growth of E. coli, while the dried gel inhibited the growth of S. aureus. The antibacterial activity involving pectin was likely due to pectin's ability to lower the pH of the media. Pectin with higher free hydroxyl group was more possible to inhibit the growth of bacteria better. **Conclusion:** Presumably, pectin with lower degree of esterification might have greater antibacterial activity and more potential as antimicrobial preservative for food application.

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Elements Characterization in Indonesian Traditional Crackers Using Neutron Activation Analysis

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Keywords: Traditional crackers · NAA · Elements
Background/Aims: Cracker "Kerupuk" is Indonesian traditional snack food or can be taken together with other main dishes that are complementary food commonly consumed by Indonesian people. Crackers are made by forming a dough from a mixture of tapioca starch, salt, sugar, monosodium glutamate, and water. The drying process of crackers generally only utilizing the people's home page due to it is still traditionally processed on a small scale as a home industry. Therefore in this research, an evaluation was conducted by determining the element in crackers to define the characteristics of food safety. **Methods:** The samples of crackers in this activity were collected from 47 traditional market cities in West Java, Central Java, East Java during period 2013–2014 and the determination of elements was carried out using Neutron Activation Analysis. The samples were irradiated at the rabbit system in the reactor G.A Siwabessy facilities with neutron flux ~ 1013 n.cm-2.s-1 and then counted using HPGe detector. Method validation was carried out by SRM Wheat Flour 1567a with recovery value was in the range of 99–100%. **Results:** The results showed that five elements Cr, Co, Fe, Se, and Zn were in the range of 0.09–1.4; 0.06–0.29; 20.93–74.29; 0.02–4.52; 1.78–12.07 ug/g respectively. Hazard Quotient of Cr, Co, Fe, Se, and Zn in crackers gave values <1. **Conclusion:** These indicated that crackers in West Java, Central Java and East Java are having good agreement with the recommended standards and safe for consumption.

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Ulna Length for Estimating Height in Indonesian Adults

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Keywords: Height · Ulna length · Adult
Background/Aims: Assessment of body height (Ht) can be estimated using ulna length (UL). MUST equation have been recommended for predicting Ht. Little information is available about the accuracy of the equation for Indonesian population. The aim of this study was to derive regression equation formula to estimate Ht from UL and compare its accuracy with MUST equation. **Methods:** This study consisted of 303 adults aged 19–29 years. Ht was measured at standing position and UL was measured at supine position using left arm. Ht and UL were measured by standard anthropometric techniques. Linear regression analysis was used to develop equation to estimate Ht from UL. Paired t test was used to analysed the difference of estimated Ht and actual Ht. The linear regression formula to estimate $Ht = 75.198 + 3.314 \, UL$ (cm). **Results:** The mean difference between estimated and actual Ht was 0.0014 cm. The mean difference between estimated (MUST Equation) and actual Ht was 8.01117 cm. There was no significant difference between estimated and actual Ht ($p > 0.05$). There was significant difference between estimated (MUST Equation) and actual Ht ($p < 0001$). **Conclusion:** The regression equation formula can be used as alternative to estimate Ht from UL and more appropriate than MUST Equation for Indonesian Adults population.

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Mid-Upper-Arm Circumference (MUAC) as Alternative for Estimating Body Mass Index (BMI)

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Keywords: Body mass index · MUAC

Background/Aims: BMI is one of parameters as marker for malnutrition in adults. People with obstacles that cannot be weighed and measured require alternative parameters. MUAC is an alternative parameter to assess nutritional status that is easy, simple, and can be done in supine position. The aim of this study was performed to analyze the relationship between BMI and MUAC and derive regression equation formula to estimate BMI from MUAC. **Methods:** This study was performed in a University in Indonesia (n = 303, aged = 19–29 years). Weight (Wt) and Height (Ht) was measured in standing position. MUAC was measured in left arm with supine position. Pearson product moment analysis was used to analyze correlation between BMI and MUAC. Linear regression analysis was used to develop equation to estimate BMI from MUAC. The equation was evaluated by using Bland-Altman analysis. **Results:** There was significant correlation between BMI and MUAC (r = 0.913; p < 0.0001). The regression equation formula to estimate BMI = 1.113 MUAC – 5.908 (R2 = 0.83, SEE = 1.89). The limit of agreement were ±3.7 kg/m^2. **Conclusion:** When it is not possible to measure Wt and Ht in standing position for calculating BMI, MUAC can be used as alternative measurement for estimating BMI.

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Intervention of The Nutrition Goes to School Program for Adolescents in Malang District, East Java: Baseline Report

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Keywords: Adolescent nutrition · School-based intervention · Nutrition goes to school

Background/Aims: Nutrition Goes to School (NGTS) program focuses on school-based nutrition promotion intervention approaches. In this report we present baseline data from our effectiveness study of NGTS intervention among adolescent in Malang, East Java. **Methods:** This report was part of a 6-months pragmatic experimental study. The intervention group received full intervention from the NGTS program: training for teachers on how to deliver nutrition education/promotion to students); strengthening the school's healthy canteen and development of school nutrition gardens; strengthening school policy; introducing information system for monitoring. The positive control group only received nutrition education for teachers. The impact of NGTS program was measured by comparing the nutritional status, health and physical endurance of students at baseline and end-line of the study. **Results:** There are 368 students from 4 schools recruited as intervention group; and 290 students from 4 schools as control group. There was no significant differences in nutritional status between the two groups. In total, 7.8% of students were obese and 12.0% were overweight. Mild anemia affects 13.1% of students, and the majority of students have low-moderate level of physical activities. The level of consumption of green vegetables and vegetables that contain a lot of vitamin A is relatively low(35% and 27.2%). Eggs, milk and processed foods is only consumed by less than half of the subjects(44.7% and 30.1). **Conclusion:** We found quite high number of students with overweight-obese, inadequate diet and had lack of physical activities and fitness in the baseline. NGTS intervention may change this findings towards a better direction.

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Relation of Breakfast History Factors, Adequacy of Macro Nutrition Levels and Nutritional Status with Children's Learning Achievement at SD Inpres Lili, Kupang District

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Keywords: Breakfast history · Adequacy of macro nutrition · Nutritional status · Child learning achievement

Background/Aims: The design of the study was a Cross Sectional Study with the aim of knowing the relationship between the history of breakfast, the level of adequacy of macro nutrition and nutritional status with the learning achievement of children in SD Inpres Lili Kupang Regency as many as 137 people. **Methods:** Data were analyzed univariate, bivariate and multivariate. **Results:** The results showed that elementary school children who had a good breakfast history category but did not have a sufficient level of energy (40.9%) and protein (31.4%) were sufficient for children's needs in the teaching and learning process thereby reducing children's learning achievement (40, 9%). In addition, there are still 33.6% of school children who have poor nutritional status which has an impact on children's learning achievement. The results of the analysis showed that there was a significant relationship between the history of breakfast, the level of adequacy of macro nutrition (energy and protein) and nutritional status with the learning achievement of students in Kupang Regency Lili SDI (pvalue = 0,000). The results of the subsequent analysis revealed that the energy adequacy level factor was a factor that could protection the decline in children's learning achievement (OR = 0.55 <1) while the breakfast history factor, protein adequacy level, and nutritional status were the same factors that reduced children's learning achievement risk (OR = 2–45.2> 1). **Conclusion:** Conclusion is the history factor break fast, the adequacy of macro nutrients and nutritional status is highly correlated with student achievement SDI Lili Kupang regency.

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Temporal Trends in Available Energy and Macronutrient Distribution in The Indonesian Diet: A Joinpoint Analysis of Food Balance Sheet Data

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Keywords: Temporal trend · Joinpoint regression analysis · Food balance sheet

Background/Aims: The aim of this study was to analyze the temporal trends and changes in available energy and macronutrient distribution in the Indonesian diet from 1961 to 2013. **Methods:** Due to the lack of long-term dietary intake dataset, this study used dataset derived from the FAO's food balance sheets. We used joinpoint regression analysis for the temporal trends. **Results:** The annual percentage change (APC) was computed for each segment of the trends. Energy availability in the Indonesian diet increased by 52.2% with an average annual percent change (AAPC) of 0.8% from 1961 to 2013. The availability of carbohydrate energy decreased by only 8.3% (AAPC= –0.2), while available energy from fat increased by 39.8% (AAPC = 0.6). Carbohydrate energy in the diet increased from 1961 to 1974 (APC = 0.10) and thereafter decreased significantly (APC= –0.44) until the year of 1988 and after a stagnant phase decreased again from 1998 to 2013 (APC= –0.32). Available energy from fat showed a zigzag upward trend. The temporal trends in the available energy from protein changed but within a very narrow limit (7.72% to 9.02%) over the last 53 years (AAPC = 0.30). **Conclusion:** The availability of energy from carbohydrate decreased in the Indonesian diet while available protein energy was grossly inadequate in the diet for the last 53 years. During the first half 1970s (1982–1988) there was a shift in the availability of carbohydrate and fat in the diet and was characterized by increased fat energy while reduced carbohydrate energy in the Indonesian diet.

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Paradoxes of Technology: Exploring Paradoxical Thinking about Functional Foods Offering a Weight-Loss Benefit

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Keywords: Weight-loss · Functional foods · Paradoxical thinking

Background/Aims: Innovative functional foods have been developed to assist consumers with their weight loss endeavours. The foods (breads, cereals and yoghurts) make an appetite reduction claim, by providing a feeling of fullness for longer due to fortification with plant phenols. The objective of this paper is to investigate consumer responses to this innovation which will be marketed in a product category where emotions, personal stress and feelings of powerlessness can prevail. In particular, the way paradoxical thinking influences the response is explored following the existing framework for consumer paradoxes of technology. **Methods:** In-depth phenomenological interviews were conducted with 14 New Zealand women attempting weight loss. The participants, after discussing their lived experiences of weight loss activities, were introduced to the foods concept. The interviews were analysed using thematic analysis and interpreted with reference to the participant's weight loss experiences. **Results:** The results reveal strong purchase intentions for the functional foods, despite scepticism. Participants provided counterarguments, and uncertainty about how the foods would work. Paradoxes were evident in feelings of both control/chaos; competence/ incompetence; freedom/enslavement. The presence of hope and motivated reasoning was interpreted as an antecedent for paradoxical thinking. Consumers cope with their ambivalence by holding optimism whilst simultaneously protecting their emotional well-being. **Conclusion:** The research identifies underlying complexities in assessments of a technology-based innovation. As consumers seek to further their overall wellbeing, such knowledge has implications for marketers looking to empower consumers. The paper makes suggestions for future research on paradoxical thinking and its relevance for other functional foods.

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The Association between Serum Carotenoid Concentrations and Metabolic Syndrome

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Keywords: Serum carotenoid · Metabolic syndrome · Central obesity

Background/Aims: Epidemiological studies have shown that serum carotenoids levels are associated with metabolic syndrome (MetS). However, most of them didn't control the effects of body mass index (BMI). This study aimed to reran the analyse with further adjustment for BMI status. **Methods:** We conducted a cross-sectional study of 462 subjects aged over 18 years in Shenzhen, Guangzhou Province, China. MetS was defined according to the Joint Interim Statement (JIS) criteria, and serum carotenoid concentrations (β-carotene and lutein) were measured by high-performance liquid chromatography-tandem mass spectrometry. **Results:** Compared with the lowest tertiles, significantly lower odds ratio (OR) of the highest tertile of serum β-carotene were 0.15 (0.08, 0.30) for MetS, 0.15 (0.08, 0.29) for central obesity, 0.15 (0.07, 0.29) for high TG, and 0.28(0.16, 0.50) for low HDL-C; the ORs (95% CIs) of central obesity for the highest tertile of serum lutein was 0.52(0.31, 0.89). After including BMI status as additional adjustment factors, the inverse association were attenuated but remained significant. The ORs (95% CIs) for the highest tertile of serum β-carotene were 0.19 (0.09, 0.39) for MetS, 0.20 (0.09, 0.40) for central obesity, 0.18 (0.09, 0.36) for high TG, and

0.37(0.22, 0.68) for low HDL-C. The ORs (95% CIs) for the highest tertile of serum lutein was 0.53(0.28, 1.00) for central obesity. **Conclusion:** The results indicated that BMI status has an influence on the association between serum carotenoids (β-carotene and lutein) and MetS, and it provided further evidence that the lower level of serum β-carotene is associated with a higher prevalence of MetS.

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Legume and Soy Food Intake and Incident Type 2 Diabetes: A Systematic Review and Meta-Analysis

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Keywords: Legumes · Soy · Type2 diabetes · Prospective · Meta-analysis

Background/Aims: Dietary guidelines have proposed dietary intake of legumes and soy food for cardiometabolic health, yet prosepective observational studies demonstrated inconsistent associations of legumes and soy food intake with incident type 2 diabetes (T2D). **Methods:** Thus, a meta-analysis was conducted to quantitatively summary the existing evidence, relevant articles were searched in PubMed, Embase and Qvid up to December 2018. Random-effects models were used to pool study-specific risk estimates, and dose response-analysis was performed to examine a potential curvilinear or linear relationship. The present meta-analysis included fifteen unique cohorts from 13 prospective studies, comprising 564385 individuals and 31769 T2D cases. **Results:** The summary RRs with 95% CIs of T2D for the highest versus lowest category were 0.97 (0.82, 1.16) for legumes, 0.86 (0.71, 1.05) for total soy food, 0.89 (0.71, 1.11) for soy milk, 0.92 (0.84, 0.99) for tofu, and 0.89 (0.82, 0.97) for soy isoflavones, respectively. Dose-response analysis showed that daily increment of 124 g tofu, 10 g soy protein and 10 mg soy isoflavones intake were associated with 32% (95% CI: 0.50, 0.93; P for trend = 0.01), 9% (95% CI:0.84, 0.99; P for trend = 0.02) and 4% 95% CI: 0.92, 0.99; P for trend = 0.04) lower risk of T2D, respectively. **Conclusion:** Intake of legumes and total soy food was not associated with risk of T2D, while intake of specific types of soy food including tofu, soy protein and isoflavones may be beneficial for the prevention of T2D.

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Are We Consuming Adequately Iodized Salt?

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Keywords: Salt fortification · Iodine · Iodization · Salt industry

Background/Aims: Universal Salt Iodization (USI) has been implemented in Indonesia since 1994. Salt for consumption must contain iodine 30–80 ppm. However, the program is still unsuccessful as the coverage is still less than 90%. This study aimed to analyze the iodine content of salt circulated in markets and consumed by households. **Methods:** A cross sectional study was conducted in Bogor District in 2016. Salt was collected from households, small traders and salt producers as much as 189, 20, and 13 samples, respectively. The iodine content was analyzed quantitatively using iodometry. Mothers in the households and small traders were interviewed on salt storage and handling. Salt producers were visited to observe the salt production. Data were analyzed descriptively. **Results:** All salt samples had claimed on the package as iodized salt. However, most salt from households (78.8%) contain iodine <30 ppm. Similar findings also discovered from small traders and salt producers (75% and 84.6%, respectively). Most households had poor practice on salt storage and handling. Salt was put in a clear container near the stove or in a cupboard and exposed to sunlight. Most salt traders store salt in a cupboard exposed to sunlight for more than two weeks. All salt producers were home industry using traditional production method. **Conclusion:** People are at risk of consuming inadequate iodized salt due to poor production, storage and handling practice. Therefore, strict monitoring and supervision to salt producers must be established by the local government. Moreover, households and small traders need to be educated on salt storage and handling.

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The Application of CEBQ in The Study on Diet Behavior of Primary School Students in China

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Keywords: Dietary behaviour · CEBQ · Primary school students · Growth and development

Background/Aims: The aim of this study are to explore the feasibility and utility of CEBQ (Children eating behavior questionnaire) in the study on dietary behavior of primary school students in China and its impact on their growth and development. **Methods:** In the survey participated were 1116 students of grades one to three in 2 primary schools randomly selected from those respectively in urban and suburban areas of Shanghai, China. The body mass index (BMI) was calculated according to the students' heights and weights reported by their parents. The students were divided into four groups of wasting, normal weight, overweight and obesity. The dietary behaviour of the students was measured and analysed by CEBQ scoring, then the difference among the four groups was compared. **Results:** The scores of Satiety responsiveness (SR), Slowness in eating(SE) and Food fussiness(FF) of overweight and obese students were significantly lower than those of the lean group, while the scores of Food responsiveness(FR) and Enjoyment of food(EF) were significantly higher than those of the lean group. The difference in scores of other dimensions between each group was not statistically significant. The overweight and obese students showed a rapid rate of eating, insufficient response to the internal satiety signal, as well as increased level of response to the external food signal and preference of the food. These eating style investigated by CEBQ seems to be a useful predictor for childhood obesity. **Conclusion:** Parents and teachers should pay more attention to the formation of children eating habits during their early life.

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Building Flavonoid Database Based on Indonesian Foods

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Keywords: Database · Flavonoid · Indonesia

Background/Aims: The prevalence of NCDs (Non-communicable Diseases) was increasing in Indonesia. The antioxidants have been known as a potential nutrient that prevent and reduce the risk of the NCDs. Flavonoid was the most abundant antioxidant in plant-source diet and consumed commonly in Indonesia. In other side, there was not a flavonoid database based on various Indonesian foods. The aim of this study was to build a flavonoid database based on Indonesian foods. **Methods:** This research was conducted at March-May 2016 in Bogor, Indonesia. The selected food items used food items of Indonesian Total Diet Survey 2014 (SDT 2014). The determination of flavonoid content used United States Department of Agriculture Database and related journals. The estimation for calculating flavonoid content used USDA Database technique. The total flavonoid content for each food items were summarize of 6 flavonoid subclasses (anthocyanidine, flavan-3-ols, flavanone, flavone, flavonols, dan isoflavone). The total flavonoid content were presented by mg/ 100 gram of each food items. **Results:** There were 13 food groups and 1203 food items in this database. There were 654 food items (54%) had flavonoid content, and the others were unknown. The highest mean of flavonoid content was legumes (45.36 mg/100 g). Legumes was also the food group that had the most foods containing flavonoid, they were 120 food items. There were 54% food items in the flavonoid database contained flavonoid. **Conclusion:** The highest mean of flavonoid content were legumes. This findings can provide valuable information for Indonesian people to increase dietary flavonoid intake.

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Prevalence and Predictors of Vitamin D Deficiency in a Nationally-Representative Sample of Australian Aboriginal and Torres Strait Islander Adults

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Keywords: Vitamin D deficiency · 25-hydroxyvitamin D · Australian Aboriginal and Torres Strait Islander adults

Background/Aims: Vitamin D deficiency is recognised as a public health problem globally. This study details the prevalence of vitamin D deficiency in a nationally-representative sample of Australian Aboriginal and Torres Strait Islander adults aged ≥18 years, and identifies demographic and lifestyle factors associated with vitamin D deficiency. **Methods:** We used data from the 2012–13 Australian Aboriginal and Torres Strait Islander Health Survey (n = 3,293). Serum 25(OH)D concentrations were measured by a liquid chromatography-tandem mass spectrometry method that is certified to the reference method developed by the National Institute of Standards and Technology and Ghent University. Vitamin D deficiency was defined as serum 25(OH)D concentrations <50 nmol/L. Survey-weighted logistic regression models were used to determine the independent predictors of vitamin D deficiency. **Results:** Approximately 27% of adults were vitamin D deficient. The prevalence of vitamin D deficiency was 39% in remote areas, compared with 23% in non-remote areas. Independent predictors of vitamin D deficiency included being assessed during winter (men, AOR = 5.7; 95% CI = 2.2, 14.6; women, AOR = 2.2; 95% CI = 1.3, 3.8) and spring (men, AOR = 3.3; 95% CI 1.4, 7.5; women, AOR = 2.6; 95% CI = 1.5, 4.5) compared with summer, and being categorised as obese (men, AOR = 2.6; 95% CI = 1.2, 5.4; women, AOR = 4.3; 95% CI = 2.8, 6.8) compared with being a healthy weight. Statistically significant associations were also evident for current smokers (men only, AOR = 2.0; 95% CI 1.2, 3.4) and persons living in remote areas (women only, AOR = 2.0; 95% CI = 1.4, 2.9). **Conclusion:** Given the high prevalence of vitamin D deficiency among Aboriginal and Torres Strait Islander adults, there is a need to develop and promote strategies to maintain adequate vitamin D status through safe sun exposure and dietary approaches.

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Antiemetic Activity of Indonesian Stingless Bee Propolis and Its Effect on Pulmonary TB Patients Body Weight Recovery

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Keywords: Antiemetic · Propolis · TB patiens · Body weight recovery

Background/Aims: Treatment for tuberculosis requires regular consumption of Anti Tuberculosis Drug (ATD) without interruption in the long term. Emetic is one of ATD hepatotoxic effects, causing a decrease in patient's nutritional status. Numerous studies indicated the biological activities of bee propolis may act both as an antiinfective material against mycobacterium tuberculosis and as a hepatoprotective effect against toxicity of ATD. This study aimed to evaluate antiemetic activity of Indonesian stingless bee propolis and its effect on pulmonary Tb body weight recovery. **Methods:** The design is a randomized clinical controlled trial, 39 subjects devided into T0 group (receiving standard dose ATD+ placebo propolis), T1 group (receiving standard dose ATD+6% propolis) and T2 group (receiving standard dose ATD+30% prop-

olis). Intervention and testing conducted double blind, during 6 months. **Results:** Interestingly, the T0 group has an average increase in emetic events of 0.86 points (2.14 on baseline to 3.00 on endline). Whereas in T1 and T2 groups respectively decreased 1.5 points (1.5 on baseline to 0 on endline) and 5.2 points (5.2 on baseline to 0 on endline). In the second week, mean body weight of T0 and T1 groups decreased by 2.4% and 0.2%, respectively. In contrast, the mean body weight in T2 group increased by 1.5% (p < 0.05; Mann-Whitney test). **Conclusions:** Administration of 30% Indonesian stingless bee propolis as complementary of ATD may effective reduce emetic and body weight recovery of patients with pulmonary Tb.

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Taxonomies used for Health Claims on Indian Packaged Foods

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Keywords: Health claims · Packaged foods · Front of pack

Background/Aims: Health claims, usually displayed on Front-of-Pack (FOP) are related to diet-linked risk factors and wellness. However, usage of various taxonomies for identical claims is sometimes confusing. Therefore, the present investigation is carried out to discover various phrases used by food manufacturers in presenting health claims. **Methods:** A total of 1,020 packaged-foods were purposively selected from various supermarkets (n = 4) and food retail outlets (n = 4) of Vadodara, Gujarat, India to examine the FOP for health claims. **Results:** Results revealed that 8.3% of the total products reported health claims. Of the total products containing health claims, "growth-related" claims (1.7%) such as "good for growth", "improves 5-signs of growth" were the most common. Growth-related claims were followed by "immunity-related" claims (1%) namely, "for immunity" and "strengthens natural immunity." The 3rd highest health claim found on the food labels were "memory, brain and nervous system related" (0.9%). Such claims were usually reported as "for brain development", "supports brain development", "helps improve memory" and "for healthy nervous system". The 4th highest health claim was "heart related" (0.8%) like "heart friendly", healthy heart" and "for strong heart" and "bones and teeth related" (0.8%). The remaining health claims were below 0.5% of the total products. Baby foods and drinks had the highest percentage (2.5% each) of health claims, followed by wheat and oats based products (2.2%), bakery products (0.5%), fruit based products (0.4%) and milk based products (0.2%). **Conclusion:** Regular monitoring is required by the food regulators to protect consumers from deceptive health claims.

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Analysis of Plasma Amino Acid Biomarkers in Filipino Workers using HPLC Fluorescence

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Keywords: Amino acid profiling · Biomarker · HPLC-fluorescence · Method validation

Background/Aims: Amino acids are vital to almost all physiological functions of the human body. Essential, non-essential and conditionally essential amino acids play important roles in the synthesis of thousands of proteins involved in life's metabolic reactions. Measurement of amino acids in whole blood, plasma or urine can help assess dietary deficiencies and provide overall biomarkers of an individual's health status. **Methods:** This study focuses on the validation of high-performance liquid chromatography procedure for simultaneous detection and quantitation of 38 amino acids in human plasma. It is then used to examine amino acid profiles of 204 Filipino workers in Metro Manila. Deproteinized plasma undergoes chromatographic separation using gradient elution on a Lithium-type cation exchange column with fluorescence detection with O-phthalaldehyde as post-derivatizing agent. The method was validated in accordance to U.S. FDA: Guidance for the Industry, Bioanalytical Method Validation. Validation results for each amino acid successfully achieved the acceptance criteria for the analytical figures of merit: linearity, selectivity, range, accuracy, precision and detection limits. The method was applied to evaluate amino acid profiles of 204 Filipino workers. **Results:** Status of essential amino acids and average plasma concentrations in µM/L were obtained: leucine (124.18 ± 33.56), isoleucine (50.27 ± 16.56), valine (250.35 ± 59.57), phenylalanine (56.18 ± 11.33), lysine (192.74 ± 37.30), threonine (128.38 ± 37.61), methionine (26.42 ± 8.77), and tryptophan (38.93 ± 11.15). Partial results for other non-essential amino acids are also calculated: aspartic acid (9.11 ± 0.84), glycine (229.28 ± 64.21), glutamic acid (48.22 ± 21.35), and tyrosine (67.36 ± 12.92).

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Early-Life Exposure to Chinese Famine Not Associated with Dietary Intake in Adulthood – Results from China Health and Nutrition Survey

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Keywords: Dietary intake · The great leap famine · Famine exposure cohorts

Background/Aims: The study aimed to investigate if early-life exposure to the Chinese famine in 1959–1961 is associated with dietary intake in adulthood (1991–2011). **Methods:** Participants (n = 6426) born in 1952–1964 in the China Health and Nutrition Survey were categorized into late childhood exposure, early childhood exposure, foetal exposure, non-famine exposure to Chinese

famine during 1959–1961. Dietary pattern in eight survey waves between 1991–2011 was generated using factor analysis and macronutrient intake was calculated from 3-day food intake collected by 24-hour recall method. The dietary pattern and macronutrient intake were compared by famine exposure status. The longitudinal association between diet and famine exposure were assessed using multilevel mixed effect regression model and adjusted for demographic, socioeconomic, lifestyle, and health factors. **Results:** Diet has changed dramatically during the three-decade study period among the participants born in 1954–1964. The dietary intake was not associated with early-life exposure status after taking account of the effect of survey period and age. For example, difference in adjusted fat intake by famine exposure at late childhood, early childhood, foetal staging was 2.2 (95% CI: –7.9, 12.4), 1.9 (95% CI: –5.8, 9.6), and 5.2 (95% CI: –0.3, 10.8), respectively, compared to the non-exposure cohort. **Conclusions:** The dietary intake in adulthood during 1991–2011 was not associated with early-life exposure to the Chinese famine in 1959–1961.

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Iodine Dosage in Salt Under SNI are Still Providing Normal Value on Iodine Status and Thyroid Function on Women Childbearing Age and School-Aged Children

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Keywords: Iodized salt · Women childbearing · School age children · Thyroid function · Urinary iodine

Background/Aims: There is an increase on the median of urinary iodine (UI) concentration in several regions in Indonesia based on National Iodine Deficiency Disorder Survey 2003, 2013 and the other research require an evaluation of national standards Indonesia for iodized salt (SNI). The Study aimed to estimate an iodine effective dose in salt that ensures normal UI levels and thyroid function for women of childbearing age and school-aged children (SAC). **Methods:** This is experimental research with a double-blind RCT design in Kepil District, Wonosobo Central of Java. Randomization with randomized block design, large block 8. Intervention group was 15–25 ppm; 25–35 ppm; 35–45 ppm; 45–55 ppm KIO3 in salt for 4 month. The number of samples was 176 women of childbearing age (18–45 years old) and 176 school-aged children (SAC) 6–12 years old. GLM-RM was used to data analysis by SPSS 22. **Results:** Median of UI was the optimal range (100–299 μg/L), in both sample group. Median UI and TSH levels were not significantly different in each intervention groups, pre and post study in the both sample group. No overt hypothyroidism and overt hyperthyroidism were found. There was 4% was subclinical hypothyroidism; 1.7% of subclinical hyperthyroidism in SAC group. Subclinical hypothyroidism and subclinical hyperthyroidism was 4.5% respectively in women of childbearing age. **Conclusions:** The intervention of iodized in salt with 15–55 ppm

KIO3 for 4 months still gives normal in median UI value and thyroid function in women of childbearing age and school-aged children.

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Development of The Thai Mixed-Dish Semi-Food Frequency Questionnaire (Semi-FFQ) for At-Risk People of Metabolic Syndrome

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Keywords: At-risk people for metabolic syndrome semi-FFQ · Thai mixed-dish

Background/Aims: Understanding dietary habits is important for studying the development and progression of metabolic syndrome and causes of non-communicable diseases (NCDs). The aim of this study was to develop Thai mixed-dish semi-food frequency questionnaire (semi-FFQ) for at-risk people of metabolic syndrome. **Methods:** We selected Thai mixed-dishes from five canteens at Siriraj Hospital, Thailand. The major ingredients, rice, meat, and vegetable groups, were weighted for portion size. Each dish was weighted by 3 samples. The nutritive values were calculated by the Thai food composition software (INMUCAL-v3.2). The nutrient profiling (NP) criteria was used to classify menus based on sodium, sugar and fat that were risk factors of NCDs. **Results:** Total of 26 Thai mixed-dish menus (N = 78) were classified into three groups: a la carte, noodles, and Thai rice with toppings. The average sodium, sugar and fat contents of a la carte (n = 21) were 1169 mg, 5.4 g and 22.5 g, respectively, while noodles (n = 33) were 1970 mg, 18 g and 2.3 g, respectively and Thai rice with toppings (n = 24) were 361 mg, 2.3 g and 11 g, respectively. Comparing menu score with NP, None was passed the 'grade A' (score > 16). Sixty percent were accepted to 'grade B' (score 12–16) while 40% were accepted to 'grade C' (score <12). The selected menus, portion size and frequency will be included in the semi-FFQ. **Conclusions:** The mixed dish-based FFQ will be provided adequate validity to assess and rank long-term dietary pattern in urban areas for most food groups and nutrients, and should be useful for studying dietary-disease relationships.

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Challenges of Evaluating Impact of Sustainable Food Security and Undernutrition Intervention: Case Study of Bukoba Rural, Republic of Tanzania

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Keywords: Food security · Ipmact evalaution · Malnutrition

Background/Aims: In Tanzania, undernutrition among children and mothers, especially in rural areas, is a common phenom-

enon. Evidence-based strategies for nutrition intervention mainly address direct determinants such as food intake whereas, community-based interventions tend to have higher efficacy when combined other proximal determinants such as women's economic and social empowerment. Women's education, access to economic means of production, ownership of assets and ability to purchase inputs are very limited, which increases their income and food insecurity. It is relatively simple to measure impact of direct determinants of undernutrition such as food intake but becomes challenging measuring impact of proximal determinants. If you do not measure results, you cannot tell success from failure (World Bank, 2004) is true but presents challenge in small rural sustainable food security interventions as food is not stand alone variable. **Methods:** Focus groups of 42 women representing 220 members of Bukoba Women's Empowerment Association, to share the findings of the first Tanzania Mainland Nutrition Survey. **Results:** This survey documented a protein deficiency for this population. The focus group discussions led to identification of direct and proximal determinants of the problem of undernutrition. Data lead to a cooperative farming project creating a collective way to cultivate soybean to improve the quality of the existing diet and an infrastructure for the women's economic sustainability and empowerment. The paper discusses the challenges of evaluating impact of direct and proximal determinants in addressing undernutrition.

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Intergenerational Transmission of Obesity: Preliminary Findings from Three Cohorts of The Malaysian National Health and Morbidity Surveys

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Keywords: Intergenerational · Obesity · Mother-child · Malaysia
Background/Aims: The increasing trend of overweight and obesity is a globalized problem with Malaysia ranking first in the prevalence of overweight and obesity among Southeast Asian countries. Prevalence of obesity in children and women are increasing at an alarming rate. The fetal overnutrition hypothesis proposed that maternal obesity could elevate the risk of lifetime obesity among the offspring. This study aimed to provide a detailed description of the proportion and trend of different body mass index (BMI) mother-child pair categories. **Methods:** Data from the National Health and Morbidity Survey (years 2006, 2011, 2015), a population-based cross-sectional study in Malaysia was utilized. In every sampled household, a mother and a child (aged between 5 to 17 years) were identified to form 'mother-child pairs' and they were matched according to their BMI. **Results:** In this current study, the proportion of normal weight mother/normal weight child (NWM/NWC) was higher than overweight mother/overweight child (OWM/OWC) for all three cohorts.

However, the proportion of OWM/OWC pairs have increased from 17.6% to 24.1% between 2006 and 2015. On the other hand, the proportion of NWM/NWC declined gradually from 32.9% to 26.5%. **Conclusions:** The proportion of overweight/obese maternal-child pair is on the rise, in line with Malaysia as a country in nutrition transition.

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Proportion of LDL Cholesterol among Indonesian Adults with Short and Non-Short Stature

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Keywords: LDL cholesterol · Adult height · Short stature
Background/Aims: A meta-analysis showed, a 6.5-cm increase in adult height significantly resulted in lower levels of non-high-density lipoprotein cholesterol. This cholesterol reflects circulating levels of the atherogenic apolipoprotein-B-containing lipoproteins including low-density lipoprotein cholesterol (LDL-C). This study is describing the proportion of LDL-C in relation to stature status of adult 20–59 years of age. **Methods:** We reanalyzed 16288 individual subset data of the National Basic Health Research (Riskesdas) 2013 with measurement of adult height and lipid profile, collated by the National Institute of Health R & D (NIHRD), Ministry of Health, Indonesia. All participants provided written consent, which was approved by the Health Research Ethical Committee, NIHRD. Concentrations of LDL-C was measured with the Cobas[®]Roche analyzer; from 20 to 700 mg/dl was accepted as valid. On average, the short statures were defined to be below 157 cm. We dropped participants with implausible: height value (defined as <80 or >250 cm). Binary logistic regressions assessed the association of adult height and LDL-C. **Results:** Mostly of participants were female (60.9%), 41.2 ± 10.3 years of age, from rural areas (55.9%), and have short stature (60.5%), have 23.5 ± 4.3 kg/m^2 of BMI, and have 62.2% of LDL-C. Adult with short stature tended to have LDL-C abnormal, especially between borderline high and very high (p < 0.000). **Conclusions:** Aspect of height may need to be considered in LDL-C examination.

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Consumption of Dietary Sodium in Low-Income Hypertensive Patients in Kuala Lumpur, Malaysia

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Keywords: Sodium · Low-income · Hypertension · Blood pressure · Salt intake

Background/Aims: Excessive intake of sodium intake has been linked as the cause of 1.7 million annual death from cardiovascular diseases. This study aims to determine the intake of sodium in low-income hypertensive patients residing in urban area of Kuala Lumpur. **Methods:** This is a cross-sectional study involving hypertensive patients who reside in low-income housing complexes in urban area of Kuala Lumpur. This survey involved 163 participants who has been diagnosed with hypertension by medical practitioner. Participants need to answer sociodemographic questions, measure their blood pressure and having their blood sample taken. Their dietary history were taken using 7 days diet history to identify their macronutrients and micronutrients intake, including sodium. Diet history also used to identify high sodium foods they take daily. **Results:** Mean systolic and diastolic blood pressure was 144.55 ± 22.79 mm Hg and 80.72 ± 12.08 mm Hg respectively. Reported diet history shows that the mean sodium intake was 2449.46 ± 1221.4 mg/day. Male consumed higher sodium when compared to female participants, with mean intake of 2587.34 ± 1249.98 mg/day and 2369.14 ± 1203.42 mg/day, respectively. **Conclusions:** The average intake of sodium measured from the diet history of low-income hypertensive patients has exceed the recommendation by WHO. The evidence from this study suggests that it is crucial to ensure that continuous health education on the effects of high sodium intake is given to this community. Their dietary habits also need to be modified. This is to reduce the risk of them getting other non-communicable diseases in the future.

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Prevalence and Determinants Factors of Anemia among Children Aged 6–23 Months in West Madura of Indonesia: A Cross-Sectional Study

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Keywords: Anemia · Determinats · Childhood

Background/Aims: Anemia among childhood is the highest prevalence and is the most public health problem in Indonesia. The study investigated the magnitude of anemia and its determinants among children aged 6–23 months in food insecurity village, Indonesia. **Methods:** A community-based cross-sectional study was performed in 10 food insecurity villages, West Madura, Indonesia. A total of 177 children aged 6–23 months were selected using systematic random sampling techniques. Socioeconomic and demographic factors and feeding practices were collected with the structured questionnaire. Hemoglobin was measured using the HemoCue® auto-analyzer. Logistic regression analysis was performed to identify determinants factors related to anemia. **Results:** The mean hemoglobin level was 9.69 ± 1.58 g/dl and the prevalence of anemia <11.0 g/dl was 79.1%. Among children whose anemia was higher in children aged 12–23 months (67.9%); still consume breastfed (70.7%); not fed breastfed exclusively during the first of six months of life (88.6%); had low dietary diversity score (72.9%), and food insecurity status (67.9%). However, in regression analysis, child's age 12–23 months (AOR = 4.7, 95% CI: 1.11–8.36); still consume breastfed (AOR = 9.2, 95% CI: 1.50–6.68); early introduced complementary food less six months (AOR = 4.7, 95% CI: 0.07–0.88); low mother education (AOR = 6.2, 95% CI: 0.09–0.76). **Conclusions:** Anemia among childhood is prevalent. The older children consume breastfed, consume complementary food before six months and mother's education was found to have a significant relation with anemia among children aged 6–23 months in poor rural. The intervention for increasing consumes food rich iron and or fortification or supplement was needed to combat and prevent anemia in children.

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Association between The Portion Sizes of Soy Sauce and Miso and Blood Pressure: The National Health and Nutrition Survey, Japan

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Keywords: Soy sauce · Miso · Blood pressure · Hypertension

Background/Aims: While the portion sizes of foods with a high sodium content are of importance in the prevention of hypertension, the association between portion sizes of food seasonings and blood pressure (BP) has not been clarified. This study aimed to investigate the association between the portion sizes of traditional Japanese seasonings soy sauce and miso and BP. **Methods:** Data on 25,738 Japanese participants (10,154 men and 15,584 women) aged ≥20 years registered in the 2012–2016 National Health and Nutrition Survey were used for this cross-sectional study. The portions sizes of soy sauce or miso were calculated by dividing the total weight of soy sauce and/or miso consumed in all the meals of the day by the number of dishes that used soy sauce and/or miso. Regression models were used to estimate the BP and prevalence of hypertension and their 95% confidence intervals according to the portion size of soy sauce or miso. **Results:** We did not observe an association between the portion sizes of soy sauce or miso and BP. A larger portion size of soy sauce or miso was associated with a higher prevalence of hypertension in the crude model among women, but no significant associations were observed in the multivariate model in both sexes. **Conclusions:** Our findings suggest that the portion sizes of soy sauce or miso are not associated with elevated BP among Japanese adults. Traditional diets using soy sauce or miso as seasonings may produce health benefits, through the higher intakes of vegetables and soy products.

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Gene-Nutrient Interaction between Vitamin B2 and B12 and The Mthfr C677T Polymorphism Impact on The Risks of Esophageal Squamous Cell Carcinoma and Precancerous Lesions

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Keywords: Gene-nutrient interaction · Vitamin B2 · Vitamin B12 · MTHFR C677T · Esophageal squamous cell carcinoma · Esophageal precancerous lesions

Background/Aims: The study aimed to assess the effect of the interaction between serum vitamin B2 or B12 concentrations and MTHFR C677T polymorphism on the risk of both ESCC and esophageal precancerous lesion (EPL), a case-control study in a high ESCC incidence Chinese population was conducted. **Methods:** Two hundred ESCC cases, 200 EPL cases and 200 normal controls were frequency-matched. Epidemiological data and blood samples were collected. Serum vitamin B2 and B12 levels were determined by double-antibody-sandwich enzyme-linked immunosorbent assay. MTHFR C677T genetic polymorphisms were assessd by polymerase chain reaction-restriction fragment length polymorphism. Chi-square ($\chi2$) test, one-way analysis of variance and multinomial logistic regression were performed. **Results:** The adjusted results indicated that the lowest quartile of both serum vitamin B2 and B12 with MTHFR C677T genotypes in EPL showed significant increased risk for variant genotype TT (OR = 4.91, 95% CI: 1.31–18.35; OR = 6.88, 95% CI: 1.10–42.80). The interaction of the highest quartile of both serum vitamin B2 and B12 with MTHFR C677T genotypes in ESCC showed significant decreased risk for wild genotype CC (OR = 0.16, 95% CI: 0.04–0.60; OR = 0.10, 95% CI: 0.02–0.46), as well as for heterozygote CT (OR = 0.23, 95% CI: 0.07–0.77; OR = 0.18, 95% CI: 0.05–0.62). **Conclusions:** Our study suggested the gene-nutrient interaction on the risks of EPL and ESCC. The MTHFR C677T genotype may modify association between serum vitamin B2 or B12 levels and the risks of EPL and ESCC. This work was supported by the National Natural Science Foundation of China (No. 81673147,81372985) and the Fundamental Research Funds for the Central Universities (No. 2242017K40035).

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Distinct Differences in Dietary Choices and Lipid Profile between Sundanese and Minangnese Women

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Keywords: Dietary choices · Lipid profile · Ethnicity

Background/Aims: Environmental factors, including dietary choices formed by ethnicity, have been known to be a prominent contributor to several non communicable diseases. Two ethnicity in Indonesia, Sundanese and Minangnese, which is well known for their distinct dietary preferences were studied to understand the differences in dietary choices and lipid profile. **Methods:** A comparative cross sectional study was applied among adult women in Purwakarta District (n = 75) and Padang Pariaman District (n = 72) representing the Sundanese and Minangnese ethnic group respectively. **Results:** It was found that salt, vegetable oil and coconut milk consumption was significantly different among the two groups. Salt intake was higher among Sundanese women (p = 0.009), while vegetable oil and coconut milk intake was higher among Minangese women (p = 0.000 and p = 0.000, respectively). This finding was confirmed with the sodium and intake which was significantly higher among the Sundanese compared to Minangnese (p = 0.000). Consequently, it was found that the total cholesterol, LDL, and HDL cholesterols of Minangnese subjects were significantly higher compared to Sundanese subjects (p = 0.000). Meanwhile, no differences were found in triglycerides. Spearman's correlation showed that there were significant correlations between vegetable oil and coconut milk intake with total, LDL and HDL cholesterol. **Conclusions:** Hence, indicating that the distinct dietary choices of the two ethnic groups, (characterized by high fat and salt intake) may potentially lead to health problems related with dyslipidemia.

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Low-Carbohydrate-Diet Score and Maternal Glucose in Pregnant Women of Guangzhou, China

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Keywords: Low-carbohydrate diets · Glucose · Pregnant women

Background/Aims: Low-carbohydrate diets (LCD) have been suggested to affect maternal glucose metabolism in western countries. We aimed to investigate the association between LCD scores during pregnancy and blood glucose in Chinese population. **Methods:** In the baseline survey of a prospective gestational diabetes

mellitus (GDM) cohort study, 1,027 women in mid-pregnancy were recruited in 2017–2018. A 75 g oral glucose tolerance test (OGTT) was used to measure fasting plasma glucose (FPG), post-prandial 1-h (PP1) and 2-h (PP2) blood glucose levels. Usual dietary intakes over the previous month were accessed using a validated food frequency questionnaire. The overall, animal, or vegetable LCD scores which represent adherence to different low-carbohydrate dietary patterns were calculated. **Results:** Of the 1,027 subjects, 194 (18.9%) was diagnosed with GDM. The odds ratio for GDM comparing highest to lowest quartile of the overall LCD score was 1.82(95% CI: 1.16, 2.86), but this association was not significant after adjustment for covariates. The overall LCD score (β:0.34, 95% CI: 0.04, 0.63) and animal LCD score in the highest quartile (β:0.33, 95% CI: 0.012, 0.64) was positively associated with PP1, while vegetable LCD score in the highest quartile (β: −0.11, 95% CI: −0.19, −0.03) was negatively associated with FBG compared to the lowest quartile. No significantly associations were found between the 3 LCD scores and PP2. **Conclusions:** A low-carbohydrate dietary pattern with high protein and fat from animal is positively associated with postprandial 1-h blood glucose, while with high protein and fat from vegetables is negatively associated with fasting plasma glucose in Chinese gravidas.

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Study of Children Under-Fives Nutrition Management in Tsunami Emergency Conditions

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Keywords: Children under-five · Emergency nutrition · Food availability · Tsunami disaster

Background/Aims: The tidal wave hit Banten taking lot of people away and giving extensive damages to infrastructure facilities. Even before the tsunami disaster, under nutrition was the single developmental challenge for Banten children. This situation expected to increase the risk of under nutrition among the vulnerable groups in particular children and women. Children under-fives are the most vulnerable group that must receive special attention and treatment. Sunda Strait Tsunami disasters that occurred along the coast of Pandeglang caused people to evacuate and have potential impact on food and nutrition crisis. **Methods:** This qualitative study was aimed to examine the nutritional management of children under-fives in tsunami emergency conditions in Panimbang, Pandeglang, which was conducted in January 2019. Data collections were carried out through focus group discussions for emergency displaced mother, have children under five years old and also in-depth interviews for stakeholders as disaster management agencies in Pandeglang. **Results:** The results showed that in the emergency situation of the tsunami disaster, the method of handling children under-fives nutrition has not been done specifically, there was limited food availability specifically for children under-fives, the amount and type of food available was not appropriate and could not meet the nutritional needs of children under-fives, limited distribution of food ingredients. The recommendation to agencies related to disaster management where had special food

for children under-fives with sufficient quantities, the right type, good quality and have cross-sectoral coordination to facilitate the distribution of food ingredients.

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A Wide Variety of Different Diets are Adopted After Symptom Onset for Multiple Sclerosis

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Keywords: Diet · Nutrition · Multiple sclerosis · MS sunshine study

Background/Aims: Little is known about the dietary changes made by people with multiple sclerosis (MS). We aimed to describe the types of dietary regimens adopted after symptom onset, and to identify potential predictors of adopting a specific, formal diet. **Methods:** We used data from the 2011–2015 MS Sunshine Study, a multi-ethnic matched case-control study in Southern California exploring environmental risk factors for MS. A total of 565 cases had data for diets and potential predictors (sex, age at symptom onset, education, race, BMI, smoking) of adopting a specific diet. We described the number and proportion (%) of participants who adopted a specified dietary regimen for nutrition and weight loss purposes after symptom onset, and the type of diet followed. Using logistic regression we investigated predictors of adopting a specific diet after symptom onset. **Results:** Approximately 8% (n = 46) of participants reported adopting a specific diet after symptom onset. Among those who adopted a specific diet, the most common diets were Weight Watchers (35%, n = 16) and Paleo (11%, n = 5), with a wide variety of other diets adopted by individual participants. **Conclusions:** Being female, and obese compared with healthy weight/underweight were significant independent predictors of changing to a specific, formal diet after symptom onset. There was no consistency in the type of diet adopted, and some diets were restrictive of potentially important food groups. Improved nutrition education may be warranted to help people with MS make healthy and lasting dietary choices.

Relationship Between Balanced Diet Practice, Healthy Living, and Fasting Habits with Quality of Life in Elderly

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Keywords: Balanced diet elderly nutrition · Indonesian elderly · Quality of life

Background/Aims: The higher the life expectancy the higher the number of elderly. Now, there is an increasing problem of diabetes mellitus among Indonesia elderly and the prevalence among women (12.7%) is higher than man (9.0%). One of it main cause is imbalanced diet. The objective of this study is to analyze the relationship between balanced diet practiced, healthy living, and fasting habits with quality of life among Indonesian elderly man and women. **Methods:** For there purpose, a cross sectional study design was applied to elderly aged >60 years (n = 200) who participated in elderly program of integrated health post (Posyandu) in Central Java. Balanced diet practice was assessed through an interview using semi quantitative food frequency questionnaire and 24-hr food recall. Quality of life was assessed using World Health Organization – Quality Of Life instrument. **Results:** This research showed that there was a significant relationship between balanced practice, healthy living, fasting habits and quality of life among women and elderly. **Conclusions:** This implies that supports from family member and health worker are needed to promote balanced diet practice and healthy lifestyle to had healthier and better quality life of elderly.

Translation and Validation of Food Insecurity Experience Scale (Fies) for Malaysian

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Keywords: Food insecurity · Reliability · Validity · Bahasa Malaysia

Background/Aims: Food insecurity occurs whenever people are not able to access enough food at all times for an active life or when adequate enough safe food acquired by socially unacceptable ways. To date, there are a few questionnaires regarding food insecurity that have been validated in Bahasa Malaysia (BM). But unfortunately not all questionnaires are translating and validating cross culturally. This study aimed to translate the Food security Experience Scale (FIES) and validate its psychometric properties. **Methods:** Two forward and backward translations involving experts in food insecurity study and experts in language were done as stipulated in a guideline, and its validation was determined by using Rasch analysis. For validity test, a cross sectional study was conducted among 200 non pregnant, non-lactating Malay women

aged 19–49 years old, living in both rural and urban areas. **Results:** The findings illustrated that BM version of FIES has good reliability coefficient value of 0.84. **Conclusions:** CBM FIES is correctly and adequately translated into Bahasa Malaysia and was found to be a reliable and valid measure of food insecurity. However, validation of BM version FIES in other areas of Malaysia is highly recommended before it is widely used to measure food insecurity in the population specifically Malaysian population.

Prevalence of Iron Deficiency Anaemia Among School Children Aged 6–12 years in Lae, Papua New Guinea

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Keywords: Papua New Guinea · Iron deficiency anaemia · School children · Haemoglobin

Background/Aims: Despite anthropometric data demonstrating persistently high stunting rates over 30–40 years, there are few studies reporting the prevalence of child micronutrient deficiencies in Papua New Guinea (PNG). **Methods:** 423 children (aged 6–12 years) from Lae, Morobe Province were assessed for haemoglobin (Hb), and 415 for serum ferritin (SF). The mean Hb concentration (95% CI) was 111.8 (110.8, 112.9) g/L, with the prevalence of anaemia (Hb <115 g/L, ages 5–11; <120 g/L, aged 12–14) in the study population being 59.8% (253/423 participants). **Results:** The mean SF concentration was 38.6 (35.5, 41.6) µg/L with 76/415 participants below the threshold of 15 ug/L, indicative of depleted iron stores. The prevalence of anaemia and low SF levels (<15 µg/L), indicative of Iron Deficiency Anaemia (IDA), was 12.5% (52/415). Subsequently C-Reactive protein (CRP), an indicator of acute inflammation, and serum transferrin receptor (sTfR), an inflammation-independent indicator of iron deficiency, were assessed to isolate IDA among anaemic subjects whose SF exceeded the 15 ug/L cut-off, since IDA may coexist with Anaemia of Inflammation (AI). Altogether, 11/158 participants with SF 15–100 µg/L tested for CRP exhibited a concentration >10 µg/mL, indicating inflammation. Serum TfR was then assessed for these participants, whereupon the sTfR Index (sTfR/logSF) was calculated to identify coexistent IDA/AI (I-IDA). Nine participants had a sTfR Index >1.03, indicative of I-IDA. In summary, 253 (59.8%) of 423 participants were anaemic, exceeding the 40% cut-off defining a severe public health issue (WHO, 2011) and 61/415 participants assessed for Hb and SF presented with IDA or I-IDA; a prevalence of 14.7%.

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Assessment of Omega-3 and Omega-6 Fatty Acid Intakes in Preschool Children

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Keywords: Omega-3 · Omega-6 · Preschool children

Background/Aims: Omega-3 and omega-6 fatty acids are known to play an essential role in growth and development, particularly brain health. The objectives of the study were to assess omega-3 and omega-6 fatty acid intakes and their main dietary sources among preschool children aged 3–6 years old. **Methods:** A cross-sectional study was conducted among children registered at one Early Education Centre (PAUD) in East Jakarta. Mothers of the children were interviewed about their children's food intake using FFQ. The Indonesian Database on Fatty Acid Composition of Indonesian Foods was used to determine the level of omega-3 and omega-6 fatty acid intake. Dietary sources were determined based on the percentage contribution of food groups to the fatty acid intakes. **Results:** As many as 17 boys and 12 girls were included in the study. The mean omega-3 and omega-6 fatty acids intake were 1.05 ± 0.84 and 16.81 ± 12.77 g/day. Children who did not meet the Indonesian RDA for omega-3 fatty acids was 45%, and for omega-6 fatty acids was 21%. Older children tended to have higher intake than younger children. The main dietary sources of omega-3 fatty acids were legumes (51.1%), poultry/meat/fish (16.6%); while that of omega-6 fatty acids were legumes (28.5%) and snacks (26.5%). **Conclusions:** Overall, the children had met the recommended amount of omega-3 and omega-6 fatty acid intake. For children who did not meet the recommended intake of omega-3 and omega-6 fatty acids are recommended to consume foods rich in PUFAs, such as legumes and fish.

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Feeding Practices among Infants and Young Children in China

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Keywords: Infants · Young children · Feeding practices

Background/Aims: Healthy infant feeding practices are based on an array of factors including maternal experiences, family demands, socioeconomic circumstances and cultural beliefs. **Methods:** In a prospective, multi-center, observational study, we assessed the feeding practices of Chinese children (ages 0 months – 4 years old). Children were recruited from well-baby clinics in Shanghai and Jinhua. A total of 2604 children were enrolled of which 1300 were 0–6 month infants (Group 1) and 1304 were 7 months – 4 years old (Group 2). Structured, self report questionnaires were used to collect data on socio-demographic factors and feeding habits. **Results:** Breastfeeding was initiated at birth for 1262 (/1304) infants. Nearly 67% of infants were breastfed exclusively while 18% received breast feeding and formula concomitantly. Among 7 months – 4 year children, 71% were taking formula and other foods. More than half of the children in this age range also received additional vitamin and mineral supplement with vitamin D being the most common. Supplement use among 7 months – 4 year children was significantly associated with feeding type, household income and rural area. **Conclusions:** This study provides important insights into the current feeding practices of infants and young children in China and thereby, can facilitate in developing appropriate interventions that offer guidance on healthy eating habits.

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Japanese Diet and Risk of Incident Frailty: The NILS-LSA Project

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Keywords: Japanese diet · Frailty · Longitudinal study

Background/Aims: Although it has been suggested that the Japanese diet is associated with a lower risk of functional disability, its effect on frailty remains unknown. The present study analyzed the association between adherence to a Japanese diet and the risk of incident frailty. **Methods:** Data were derived from the National Institute for Longevity Sciences-Longitudinal Study of Aging. A total of 1,283 non-frail community-dwelling Japanese participants aged 42–81 years at the baseline (second wave) were re-examined at least twice over the follow-up period (third to seventh wave). A weighted Japanese diet index (wJDI, ranging from –1 to 11) was developed with 9 food components (i.e. rice, green and yellow vegetables, fruit, fish and shellfish, seaweeds, green tea, soybeans and soybean foods, mushrooms, and beef and pork). Incident frailty was defined as fulfilling at least 3 out of 5 criteria (weight loss, fatigue, physical inactivity, slowness, and muscle weakness). Multivariate adjusted odds ratios (OR) and 95% confidence intervals (CI) for incident frailty in each study wave according to a 1 standard deviation increase, or tertiles of the wJDI score were estimated by applying a Generalized Estimating Equation to the cumulative data. **Results:** The multivariate adjusted OR (95% CI) for incident frailty was 0.76 (0.61–0.95; trend P = 0.02) with a 1 SD increase in the wJDI score, or 1.00 (reference), 0.54 (0.35–0.83), and 0.53 (0.33–0.84) according to the lowest through highest tertiles of the wJDI score, respectively (trend P = 0.02). **Conclusions:** Adherence to a Japanese diet appears to offer protection against frailty.

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Targeted Public Distribution System and Food and Nutritional Security in Adults from Slum Households of Vadodara Western India

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Keywords: Targeted public distribution system · Food and nutrition security · Individual dietary diversity

Background/Aims: The Targeted Public Distribution System (TPDS) is the largest food safety net program in India (supplying food grains at subsidized price) however, the vulnerable population has not benefited as envisaged. Therefore, the present investigation aimed to evaluate the functioning of TPDS and its role in promoting Food and Nutrition Security (FNS) in adults from slum households of Vadodara. **Methods:** Sixteen Fair Price Shops (FPS) catering to the study population, adult males (212) and females (245) from 245 slum households were selected using stratified random sampling. FNS was assessed using Individual Dietary Diversity Score (IDDS), availability, accessibility and utilization of TPDS and data on functioning of TPDS (functionary and beneficiary perspective) were collected. **Results:** Majority (68%) of the households and FPS (75%) reported timely receipt of subsidized grains thus ensuring availability of food. The accessibility to food was jeopardized due to non-functioning of FPS during stipulated hours. Seventy one percent of the population lacked FNS as indicated by IDD Score. The households utilizing grains from FPS had better IDD score. Poor FNS (82% household) was also due to poor quality of grains and therefore poor utilization of food. Observations carried out on functioning of the FPS confirmed the remarks by beneficiaries on poor quality of grains and not functioning during the stipulated working hours. **Conclusions:** Improving the quality of grains and functioning of the FPS can improve the FNS in the population from slums of Vadodara.

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Age Specific Mid-Upper Arm Circumference Cut-Offs for Screening of Severe Acute Malnutrition in Children 7–36 Months from Urban Vadodara, India

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Keywords: SAM · MAM · MUAC cut-offs · WHZ

Background/Aims: Mid-upper arm circumference (MUAC) is used in field situation for identification of SAM (cut off of <11.5 cm) and MAM (cut off of 11.5 cm-12.5 cm). The sensitivity and specificity of these cut-offs has been questioned often and therefore an attempt to arrive at age-specific cut-offs was made in the present study. **Methods:** A total of 1736 children in the age group of 7–36 months were screened for SAM and MAM using MUAC and WHZ score from urban slums of Vadodara. Data were analyzed using WHO Anthro and SPSS software. Sensitivity and spec-

ificity of various MUAC cutoffs were calculated and the cutoff with the highest Youden index was derived for specific age groups. Highest Youden index was obtained for MUAC cut off of <11.5 cm, <12.5 cm and <13.0 cm for the age groups 7–12 months, 13–24 months and 25–36 months respectively by plotting ROC curves for same. MUAC (WHO cut off <11.5 cm) identified more children as SAM in the younger age group. **Results:** Present body weight showed the highest correlation with MUAC as compared to WAZ and WHZ indicating that a little change in child's weight would alter MUAC thus making it an appropriate indicator of acute malnutrition. Gender did not influence MUAC and WHZ in the study population. There is a need to conduct similar studies in a larger population, different geographic settings, and ethnic groups so that age and gender-specific MUAC cutoffs may be derived for early identification of SAM and MAM.

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In Vitro Starch Hydrolysis and Estimated Glycaemic Index of Biscuits from Unripe Banana Peel Flour

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Keywords: Banana peel flour · Biscuits · Glycaemic index · Total starch · Dietary fibre

Background/Aims: Unripe banana peel flour (UBPF) was evaluated as functional food ingredient when incorporated in food sample. **Methods:** Various level of UBPF ranging from 0% to 40% was used in the formulations of biscuits. **Results:** The chemical composition of UBPF showed that total starch (41.4%) and total dietary fibre (37.6%) were the highest constituents. Of the total dietary fibre, insoluble dietary fibre composition was significantly higher compared to soluble dietary fibre. The partial substitution of UBPF into the biscuit formulations significantly increased the total dietary fibre content from 1.83% to 4.70%. The starch hydrolysis and estimated glycaemic index (eGI) of these biscuit formulations were evaluated by enzymatic *in-vitro* digestion. The highest hydrolysis index (HI) of 55.27% was observed in 0% of UBPF which also resulted in highest estimated glycaemic index (eGI) of 70.07%. The values of HI and eGI between the formulations were comparable in which biscuit with 40% of UBPF had lowest HI and eGI of 37.27% and 60.19%, respectively. **Conclusions:** This study showed that the more UBPF being used in the formulation of biscuits, the lower the value of HI and eGI.

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Association Between Food Habits and Nutritional Status of Secondary School Students in Kuala Lumpur, Malaysia: Baseline Findings from Nuteen Project

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Keywords: Food habits · BMI for age · Adolescent

Background/Aims: Dietary habits and choice of food influences nutritional status of adolescence. Malnutrition have been associated with adolescents' dietary habits that may predispose to chronic disease during their adulthood. The aim of this study is to determine the association between food habit and nutritional status of adolescents. **Methods:** In the baseline study, a total of 924 students from 10 secondary schools were randomly selected from a total of 62 secondary schools in Kuala Lumpur. The students were assessed on various dietary components including food habits using a structured questionnaire as well as for anthropometry measurements. All data were analyzed using SPSS 23. **Results:** The prevalence of obesity was significantly higher among males compared to females (16.4% vs. 8.4%, X2 = 25.42, p < 0.001). Food habit exhibit an inversed association with z-score of body mass index for age (β = − 0.107, 95% CI = − 0.053, − 0.013), especially via food habits such as often eat dinner (r =- 0.102, p = 0.002), often have breakfast before school (r = −0.100, p = 0.002), often eat cake or dessert at meal (r = −0.110, p = 0.001), often drink eight glasses of water (r = 0.132, p < 0.001), often eat food from school canteen (r = −0.071, p = 0.031) and often bring own snack from home (r = − 0.112, p = 0.001). **Conclusions:** This study suggested that the type of food and timing of meal should be considered to prevent obesity among adolescents.

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Association of Beverages Consumption with Body Weight Status among Non-Muslims Adults in Seremban, Negeri Sembilan

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Keywords: Beverages · Body mass index · Malaysia

Background/Aims: Different cultures may encourage or frown upon consumption of different beverages by individuals who belong to their groups. Considerable attention has to be given to beverage consumption as the high calories content may be linked to prevalence of obesity in Malaysia. The aim of this study was to determine the association between beverages consumption and body weight status of non-Muslims adults. **Methods:** A total of 196 non-muslim was recruited in this study as they are not-restricted by the Halal policy in Malaysia especially in assessing the alcoholic beverages consumption. A self-administrated Beverage Intake Questionnaire was used to assess the frequency and portion size of 14 distinct groups of beverages. SPSS version 23 was used for data analysis. **Results:** The prevalence of obesity (BMI > 30 kg/m^2) among the study participants was 17.6%. The total calories per day from beverage showed a significant positive and moderate correlation with BMI (r = 0.211, p < 0.001) especially in the consumption of carbonated soft drink (r = 0.23, p = 0.001), juices (r = 0.18, p = 0.010) and chocolate based drink (r = 0.23, p = 0.001). Logistic regression analysis showed that those with high calories consumption from beverages significantly doubled the chance of being overweight/obesity (OR = 2.17, 95% CI = 1.21, 3.88). **Conclusion:** Therefore, a targeted-group intervention to reduce the consumption of beverages which contribute extra calories to daily energy intake especially the sugary drinks, should be develop in the context of weight management.

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Gene-Nutrient Interactions on Central Obesity in Asia: Findings from The Genuine Collaboration – A Study Funded by The British Nutrition Foundation

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Keywords: Obesity · Genuine collaboration · Nutrigenetics · Personalised nutrition

Background/Aims: Obesity is caused by the interaction of overconsumption of energy, sedentary lifestyle and genetic susceptibility. Although several studies have examined the interactions between genes and macronutrients (i.e., nutrigenetics) on the development of obesity, the findings have been quite inconsistent. To address this issue, a large-scale study called GeNuIne (Gene-Nutrient Interactions) Collaboration, funded by the British Nutrition Foundation, was initiated to perform gene-diet interactions on obesity using data from various ethnic groups. Nutrigenetic studies were conducted for the first time in the UK, South Asia (India & Sri Lanka), South East Asia (Indonesia), South America (Brazil), Africa (Ghana) and Turkey. **Methods:** Twenty genetic variants, that were identified by genome-wide association scans for obesity, were chosen as candidates and genetic risk scores (GRS) were constructed using these variants. Dietary intake was assessed using validated food frequency questionnaires. **Results:** Nutrigenetic study in South Asians has shown that individuals who carried 8 or less risk alleles for obesity had 7.47% lower waist-hip-ratio measurements in the highest tertile of carbohydrate intake compared to those with 9 or more risk alleles (P = 0.035); while the study in Indonesia demonstrated a significant interaction between GRS and protein intake on waist circumference (P = 0.032). Findings from other developing countries confirmed the existence of heterogeneity in gene-diet interactions. The GeNuIne Collaboration is the first to provide evidence for gene–diet interactions on central obesity in South Asians and South East Asians and has identified novel interactions in other developing countries, which can possibly be used for implementing personalising diets for each ethnic group.

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Dietary Intake and Nutrient Adequacy among Pre-Pubertal Malaysian Children from Low Income Families in Kuala Lumpur

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Keywords: Children dietary intake · Low income · Nutrient adequacy

Background/Aims: Direct evidence on the adequacy of dietary intakes among Malaysian children from low income families in urban communities is limited. We evaluated the baseline 7-day diet histories of 243 pre-pubertal Malaysian children aged 9 to 11 years old from Kuala Lumpur participating in the effects of prebiotic fiber on bone health (PREBONE-Kids) study. **Methods:** Sociodemographic and anthropometric measurements were collected. Daily intakes of energy, macronutrients, micronutrients and servings of food were analysed. **Results:** About 79% of the families reported household monthly income below the median for urban communities in Kuala Lumpur. More than half of the children had normal BMI-for-age (59.8%) with 8.6% thinness and 31.7% overweight/obesity. Dietary fat intake was relatively high contributing to 35% of the energy(en) intake due to frequent consumption of fried foods. Energy intake from dietary carbohydrate was 50%en with high consumption of sugar-sweetened beverages while dietary protein intake was adequate (15%en) with fried chicken and eggs as major protein foods. Vegetables and fruits consumption were 50% below recommended serving sizes. Major micronutrients needed for growth such as calcium, vitamins A, C, D were inadequate (<50% of recommended nutrient intake) except for iron intake. Sodium intake was 133% above the limit of recommendation. **Conclusions:** Our findings show that children from low-income urban families in Kuala Lumpur eat affordable foods but less nutritious diet. This warrants further investigation on how to optimise the dietary intakes to promote healthy food choices in these children and support growth.

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Characteristic of Micronutrients in Tofu from Several Cities in Java Island Indonesia

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Keywords: Tofu · Micronutrient · NAA

Background/Aims: Tofu is a traditional food such as curd made from soy milk with additional coagulants which is widely consumed by people in Indonesia and Asian countries. Tofu is one of the important sources of micronutrients, such as Co, Cr, Fe, Se and Zn. Therefore the content of various elements both toxic and essential need to be studied to ensure the food safety and estimating their contribution to daily intake. **Methods:** In this research, the determination of micronutrient content in tofu was carried out in the samples collected from Jakarta, Yogyakarta, West, Central and East Java Provinces during the period 2010–2014. Determination of elemental concentration was carried out using neutron activation analysis (NAA) methods. **Results:** This research showed that the elemental concentrations of Co, Cr, Fe, Se and Zn in white tofu were in the range of 0.001–0.27; 0.01–0.35; 2.50–62.90; 0.01–19.35 and 0.02–21.19 mg/Kg respectively. The daily intake value of tofu is calculated by estimating their contribution based on the concentration and consumption data. The average daily Co, Cr, Fe, Se and Zn intake contributes to 1.33–11.95; 2.10–2.93; 2.66–5.99, 32.78 and 1.95–2.69% of RDA values for adult women and men. **Conclusions:** The mean daily intakes of Co, Cr, Fe, Se and Zn were significantly less than the RDA for adult women and men.

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Needs Survey of Food Safety Intervention Through We-Media: A Cross-Sectional Survey among Junior Educational and Medical University Students in Chongqing, China

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Keywords: We-Media · Food safety · Intervention · Need · University student

Background/Aims: There were many intervention studies about food safety KAP among university students, but seldom of them conducted the needs survey. The study aimed to explore the needs for food safety information through We-media among educational and medical college students. **Methods:** A cross-sectional survey among junior educational and medical university students was conducted in Chongqing, China in 2016. 1250 educational students and 1434 medical students participated in the questionnaire survey. There were 71.4% of the educational students and 64.8% of the medical students willing to accept food safety intervention by We-media. There were 47.6% of the educational students and 48.8% of the medical students willing to accept food safety information through the WeChat subscription number. **Results:** 83.8%, 63.9%, 59.6% and 13.0% of the educational students want to acquire food safety knowledge by picture, text, video, and voice, separately. 84.7%, 67.7%, 62.3% and 11.9% of the medical students want to acquire food safety knowledge by picture, text, video, and voice, separately. Gender, school category and whether paid attention to food safety information through We-media were the influencing factors of participants' willingness to intervene in food safety through We-media (p < 0.05). **Conclusions:** This study showed that We-media would be an appropriate intervention approach for the educational and medical students to accept food safety inter-

vention. The WeChat subscription number would be the best platform. Pictures, text and video were the most popular form for students to acquire food safety knowledge.

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Assessing Causality between Childhood Obesity and Early Puberty: A Bidirectional Mendelian Randomization and Longitudinal Study

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Keywords: Mendelian randomization analysis · Early puberty · Causality · Overweight · Longitudinal study

Background/Aims: Obesity and early puberty are mutually causative. We investigated the causal relationship between adiposity and early puberty by performing bidirectional Mendelian randomization (MR) and longitudinal data analyses. **Methods:** We used information from the Taiwan Children Health Study (3109 adolescents aged 11–12 years) with 17 body mass index (BMI)- and 10 puberty-related single-nucleotide polymorphisms (SNPs) to produce genetic instrumental variables (IVs). The two-stage least squares (2SLS) method and MR sensitivity analysis were used to explore causality. We implemented generalized estimating equations and a discrete time hazard model (DTHM) to confirm causality. Genetic IVs for puberty and adiposity were adequate. Regression estimates from IVs revealed that an association of BMI with early puberty risk (coefficients: 0.13, 0.10, and 0.09; 95% confidence intervals: 0.07–0.19, 0.02–0.19, and 0.02–0.16; and $p = 6.4 \times 10^{-16}$, 0.04, and 0.02 for all participants, male adolescents, and female adolescents, respectively). Genetic IVs for puberty were not associated with BMI. MR sensitivity and two-sample MR analyses produced similar results. Longitudinal analysis results revealed that prepubertal overweightness could predict early onset of puberty. However, after excluding children with a history of overweightness at the age of 7–12 years, early puberty was not found to trigger new-onset of overweightness at the age of 18 years in either sex. **Conclusions:** Higher adiposity may lead to early puberty. However, the causal effects of early puberty on adiposity accumulation were less likely. Targeted interventions to reduce childhood obesity are strongly recommended to prevent early puberty onset.

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Effect of Sunlight Exposure and Serum 25(OH)D on Risk of Obesity and Metabolic Syndrome in Older Adults in Taiwan

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Keywords: Vitamin D · Older adults · Taiwanese · Sunlight exposure

Background/Aims: Obese have lower 25-hydroxyvitamin D (25(OH)D) concentrations than did normal-weight older adults. Nevertheless, the roles of dietary vitamin D intake and sunlight exposure in the risk of obesity are unclear. This study investigated the associations among vitamin D status (dietary intake, sunlight exposure, and serum 25(OH)D), obesity, and metabolic syndrome (MetS) in older adults in subtropical Taiwan. Data of 534 men and 505 women aged ≥65 years were recruited from representative data of the 2013–2016 Nutrition and Health Survey in Taiwan. Participants' dietary vitamin D intake was assessed using a 24-hour dietary recall, and the duration of sunlight exposure and anthropometric measurements, lipid profile were obtained using questionnaires and physical examinations at baseline. Serum 25(OH)D was evaluated through an electrochemiluminescence immunoassay. Serum 25(OH)D concentrations were sufficient (≥30 ng/mL) in 74% of the men and 47.4% of the women. Multiple logistic regression revealed that in men, higher 25(OH)D concentrations (≥30 ng/mL) associated with lower risk of overweight (odds ratio [OR]: 0.26; 95% confidence interval [CI]: 0.08–0.82) and high waist circumference (WC) (OR: 0.14; 95% CI: 0.04–0.50) compared with low 25(OH)D (<20 ng/mL). Moreover, men and women with higher 25(OH)D concentrations had 78% and 27% lower risks of MetS, respectively. Similar findings were observed between sunlight exposure (³60 min/times) and MetS and high WC but not for dietary vitamin D intake. **Conclusions:** Sufficient 25(OH)D concentrations and sunlight exposure were associated with a lower risk of obesity and MetS for older adults, particularly in men.

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Physico-Chemical Quality Discrimination and Volatile Flavor Profiling of Regional Non-Centrifugal Sugar Made From Sugarcane, Palm, and Coconut

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Keywords: Non-centrifugal brown sugar · Physico-chemical quality · Antioxidant activity · Volatile flavor profiles

Background/Aims: Non-centrifugal sugar (NCS) is a dehydrated-solidified form of sugar syrup or sap, and widely used as table sugar, snack, and raw material for the production of various foods. To assess food quality and flavor profile differences of regional NCS products, seven sugarcane-, three palm-, and two coconut-made NCS across Japan, Thailand, Vietnam, and Indonesia were assessed in term of their physico-chemical and volatile flavor properties. **Methods:** The physico-chemical quality of each NCS included color index, total phenolic, total flavonoid, and antioxidant activity, analyzed by 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging activity and oxygen radical absorbance capacity (ORAC) assays. The composition of volatiles in NCS was evaluated through static headspace-gas chromatography-flame ionization detection/mass spectrophotometry. **Results:** The NCS from sugarcane presented darker color index than products from palm and coconut, suggesting sugarcane-made NCS might retain considerable amount of molasses that was derived from non-centrifugation process. The lack of molasses removal in sugarcane-made NCS also contributed to their superior phenolic and flavonoid contents, as well as antioxidant potentials, particularly in Japanese and Thai NCSs, as indicated by higher DPPH radical inhibitions and ORAC values (25.72–87.37% and 7.41–38.16 mg-Trolox equivalent/g, respectively). Each NCS had distinct volatile flavor composition, wherein their predominant compounds were differed based on material and origin, including acetic acid (in Japanese and Thai sugarcane- and Indonesian palm-made NCSs) and [R-(R*,R*)]-2,3-butanediol (Thai palm-made NCS). **Conclusion:** Taken together, material of NCS much affect its color values, bioactive contents, and antioxidant potentials, whilst both material and origin factors differentiate its volatile flavor profile.

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Longitudinal and Quadratic Relations of Dietary and Serum Cholesterol with Cognitive Decline in Midlife: Results from Emcoa Study

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Keywords: Dietary cholesterol · Blood cholesterol · Cognitive decline · Quadratic relations

Background/Aims: Previous studies regarding the cholesterol-cognition relationship in middle-aged and elderly adults have generated conflicting results. We thus investigated whether dietary and blood cholesterol were associated with cognitive decline. **Methods:** Participants were drawn from a large cohort study entitled the Effects and Mechanism Investigation of Cholesterol and Oxysterol on Alzheimer's disease (EMCOA) study. We included 1606 participants who completed a selection of comprehensive cognitive tests and were followed twice for an average of 4 years. Blood concentrations of total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), and triglycerides (TG) were assessed and dietary cholesterol was investigated by semi-quantified food frequency questionnaire (FFQ) at baseline. The longitudinal effects of dietary and blood cholesterol on risk of incident mild cognitive impairment (MCI) or a greater than expected rate of global cognitive decline (decrease in Montreal Cognitive Assessment (MoCA) > 3 points) were examined using Cox proportional hazards models. The quadratic relations of cholesterol with domain-specific cognitive decline was evaluated with mixed effect model and marginal effects. After adjustment for multiple potential confounders, quadratic relations of dietary cholesterol to verbal memory, processing speed and attention were observed. **Results:** Higher ratio of LDL-C/HDL-C (>3.19) was significantly associated with higher risk of incident MCI (HR = 1.99, 95% CI = 1.08–3.66) and LDL-C level more than 3.12 mmol/L was also positively associated with accelerated global cognitive decline (HR = 1.79, 95% CI = 1.07–2.97). Quadratic relations of HDL-C to processing speed was also observed. **Conclusion:** High and low dietary and blood cholesterol may confer both risk for cognitive decline in midlife.

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Characteristics of Eating Habits in Student Athletes-Examination Based on Gender Difference

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Keywords: Athlete · College student · Female · Dietary assessment self-check-sheet

Background/Aims: Although meals play an important role for athletes, college life changes their lifestyle lives requiring self-management in daily life. For female athletes, dietary restrictions

caused by the weight loss preference of contemporary women and competition performance are observed. Female student athletes are reported to have excessive or insufficient intake of nutrients, diet. The study aime to compare dietary habits in university student athletes by gender for clarifying characteristics of eating habits in females. **Methods:** Subjects were first-graders belonging to T University Sports Club Movement Division, and those who completed the survey and did not receive meals. In order to compare between men and women, only one member was excluded from the competition category of only male members. The investigation period was from April to June 2018, three times using dietary assessment self-check-sheet (Omi, et al., 2008) and meal check form (class assignment print). **Results:** Using Mann-Whitney's U test, we set P <0.05. Staple food of Dinner of dietary assessment self-check-sheet females showed a significantly low value in staple food score, while score of dairy product had significantly high value. Additionally, the number of times of dinner absence, as of April, showed a significantly high value, and number of eating out and supplementation was significantly low. **Conclusion:** Compared to males, women take less staple food at dinner, and the frequency of eating out and supplementing meal was small. Additionally, women were found to take more dairy products than men.

The Metabolic Syndrome Prevalence and Associated Risk Factor Findings in The Chinese Population

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Keywords: Metabolic syndrome · Chinese adult · Obesity · Diabetes

Background/Aims: China has experienced a remarkable epidemiological and demographic transition during the past three decades. Limited information is available about the extent to which the metabolic syndrome (MS) is associated with demographic and potentially modifiable lifestyle factors in the Chinese population. **Methods:** Analysis of cross-sectional data on 104 098 adult aged 18 years or above from 150 sites of 31 provinces from the China National Health and Nutrition Surveillance (2010–2012), a cross-sectional survey of a nationally representative sample of Chinese population. Prevalence of MS was defined by the diagnostic criteria of China Diabetes Society. Complex sampling weighing method was used to calculate the prevalence and its 95% CI of MS. **Results:** The prevalence of the MS was 18.7%. The MS was more prevalent in urban than in rural areas and more prevalent in men than in women. The prevalence showed an increasing trend with age. As was observed in the comparison between the prevalence of four components of MS, the prevalence of hypertension (34.4%), Low HDL-C(32.6%) and abdominal obesity (25.8%) showed more severity than it of high triglycerides (23.7%), and hyperglycemia (16.2%). High body mass index, low vegetable consumption, high meat consumption, high alcohol consumption, physical inactivity and family history of hypertension and diabetes were associated with increased odds of the MS. **Conclusion:** The MS is present in more than 18% of the Chinese adult population; is associated with

several potentially modifiable lifestyle factors.Identification and clinical management of this high-risk group is an important aspect of chronic disease prevention.

The Effect of Vitamin D Receptor Polymorphisms on Peak Bone Mass in Young Japanese Women

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Keywords: Vitamin D receptor polymorphism · Peak bone mass · Young Japanese women

Background/Aims: Active vitamin D promotes calcium absorption through vitamin D receptor (VDR). There are multiple single nucleotide polymorphisms (SNPs) in VDR genes. These SNPs have been considered as candidate gene polymorphisms for peak bone mass due to the relevance of VDR for calcium metabolism. There are a large number of studies that examined the impact of VDR polymorphisms on bone mass, however these results are conflicting and to date, few studies investigating this correlation have been conducted in Japanese. The purpose of this study is to examine the effect of VDR polymorphisms on peak bone mass in young Japanese women. **Methods:** A cross sectional study was conducted among female students with age 20–24 in Tokyo Kasei University (n = 477). Peak bone mass was assessed by ultrasound measurements at the right calcaneus. The subjects were asked their dietary habits, sports experience and the age at menarche. DNA was extracted from saliva and analyzed by real-time PCR. We investigated TaqI, ApaI, FokI and BsmI polymorphisms of VDR genes. **Results:** In the BsmI genotype, peak bone mass in the AA group was significantly lower than in other two groups. However, the difference was not statistically significant when adjusted for covariates. In addition, there was no correlation between peak bone mass and the other VDR polymorphisms (TaqI, ApaI and FokI). **Conclusion:** These findings suggest that BsmI polymorphisms potentially have some effects on peak bone mass in young Japanese women.

Beyond Undernutrition: An Ethnography Approach to Breaking Food Choice Barrier on Pregnant Mother in West Sumbawa

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Keywords: Food taboo · Undernutrition · Madi · West Sumbawa

Background/Aims: Inadequate nutrition adversely affects pregnancy and birth outcomes, particularly vulnerable are the ru-

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ral women in a rural setting. Undernutrition is a common finding in Poto Tano District, West Sumbawa with prevalence was 11.63% on pregnant mother. Understanding the context of food choices on pregnant mother is recognized as essential for designing appropriate nutrition interventions. This research aim to assess the food practices and belief during pregnancy and to identify opportunities to improve existing nutrition program. **Methods:** The study was conducted during the period of August to December 2017. Data was collected using field observation and In-Depth Interviews to the head of the village, shaman, and pregnant mother in Poto Tano District, West Sumbawa. The mothers did not change the amount and type of foods to take into account their increased nutritional need during pregnancy. **Results:** 'Madi' a local belief that prohibits pregnant mom to consume seafood and egg affect food choice. Mothers believe that prohibition and taboo exist to protect the health of mothers and their babies. Moreover, Most of the pregnant mother had inadequate dietary energy intake due to the consumption of mixed rice with raw water, low iodine salt, with shrimp crackers. **Conclusion:** Food taboos were found to be dominant among remote rural residents with little access to nutrition and health services. Information on the importance of adequate food intake during pregnancy, both in terms of quantity and quality, are needed.

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Improvement of Nutrient Profile of 'Srikaya' with Incorporation of Soymilk and Inulin

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Keywords: Srikaya · Spread · Coconut milk · Soymilk · Fat replacer · Inulin
Background/Aims: 'Srikaya' is a spread consumed widely around South East Asia countries, such as Indonesia, Malaysia, and Singapore. It is traditionally made of eggs, coconut milk, and sugar, making it a high-fat, high-sugar, and high-calorie product. Therefore, this study experimented in replacing the use of coconut milk with soymilk in 'srikaya', whose sugar has been partially substituted with inulin to reduce its sugar content. This study was aimed to determine the effects of different percentages of soymilk substitution (0%, 25%, 50%, 75%, and 100%) on physicochemical characteristics and sensory acceptance of 'srikaya'. **Methods:** Data collected were analysed with ANOVA followed by Tukey's test. **Results:** Soymilk substitution significantly increased (p < 0.05) moisture content, protein content, ash content, oxidative stability, viscosity, and consistency of *seri kaya*, while decreasing the samples' fat content and available carbohydrate content. Moreover, soymilk substitution also significantly affected (p < 0.05) sensory acceptance of *seri kaya* in terms of color, spreadability, texture (mouthfeel), taste, and overall acceptance. The most accepted sample was the one with 25% soymilk substitution, which could provide higher unsaturated and essential fatty acid contents and lower saturated fatty acids compared to control sample. **Conclusion:**

This study showed that soymilk and inulin had potential to be used in 'srikaya' in order to produce healthier version of this traditional spread.

Poster Presentation

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Differences in Neonates Body Weight of Exclusive Breastfeeding and Non Exclusive Breastfeeding Infant in Depati Hamzah Hospital, Pangkalpinang

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Keywords: Exclusive breastfeeding · Neonates · Weight
Background/Aims: Exclusive breastfeeding is the first and foremost of natural food for baby because breastfeeding can fulfill the baby's needs for energy and nutrients the baby even during the first 6 months of life. The Ministry of Health Republic of Indonesia in 2015 targets for exclusive breastfeeding 80%. In 2013, the highest coverage of exclusive breastfeeding in Bangka Belitung is Pangkalpinang (59.4%), so this study aimed to assess the difference between the status of exclusive breastfeeding (EB) and non exclusive breastfeeding (NEB) to changes the body weight of neonates in Depati Hamzah Hospital, Pangkalpinang. **Methods:** This type of research was a cohort with a sample of 34 mothers who gave birth in Depati Hamzah, Pangkalpinang Hospital in June-July 2015. Body weight of neonates was measured every 7 consecutive days for 28 days. The independent t-test aimed to see the difference in body weight. **Results:** The results showed that 44.1% infants were categorized as EB and 55.9% infants were categorized as NEB. The mean body weight of neonates of EB at the age of one month was 1346.7 g and NEB was 981.6 g. **Conclusion:** The results of bivariate analysis showed that there was no difference significantly of mean body weight between EB and NEB group.

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Comparisons of Two Methods for Deriving Dietary Patterns in Association with The Severity of Impaired Kidney Function in Taiwanese Middle-Aged and Elderly Adults

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Keywords: Dietary pattern · Severity of impaired kidney function · Principal component analysis · Reduced rank regression

Background/Aims: Impaired kidney function as a characteristic of chronic kidney disease now is becoming a global health problem. Moreover, dietary intake has been linked to the risk for the development of chronic disease. We aimed to explore and compare the association between dietary patterns and the severity of impaired kidney function in middle-aged and elderly adults using two methods for identifying dietary patterns. **Methods:** The data of middle-aged and elderly adults (n = 41,128) with estimated glomerular filtration rate (eGFR) less than 90 ml/min/1.73 m^2 and positive proteinuria were retrieved from a health screening database between 2008 and 2010 in Taiwan. Dietary patterns were derived by either principal component analysis (PCA) or reduced rank regression (RRR) model from 22 food groups. **Results:** Participant with moderately/severely impaired kidney function were likely to be older, heavier, and had higher blood pressure and blood lipids compare with those with mildly impaired kidney function. The adjusted odds ratio for the development of moderately/severely impaired kidney function was 1.12 (95% CI 0.99–1.26, P = 0.06) in the tertile 3 of PCA-derived dietary pattern (deep fried food, preserved-processed foods, dipping sauce, meat, and sugary drinks) and 1.14 (95% CI 1.01–1.27, P = 0.03) in the tertile 3 of RRR-derived dietary pattern (seafood, meat, organ meats, rice or flour product, and preserved/processed foods). **Conclusion:** Our findings suggested that the RRR model provided a better association between dietary patterns and the severity of impaired kidney function in middle-aged and elderly adults compared with the PCA method.

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Sensory Appeal and Mood Factors in Influencing Food Choices of People with Metabolic Syndrome in Yogyakarta, Indonesia

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Keywords: Metabolic syndrome · Food choice
Background/Aims: Food choice is a basic nature in human behavior to choose food which most attractive and delicious for them. Unhealthy food choice can be one of the dietary factors related to degenerative disease, including Metabolic Syndrome (Mets). The aim of this study is to determine factors that influence people regarding decision on their food choices which leads to metabolic syndrome (Mets) in Yogyakarta. **Methods:** A case-control study done in Yogyakarta, Indonesia in September 2018. 81 participants were selected from 4 Primary Health Care Center in Yogyakarta. The Nine factors of food choice are the convenience, natural content, weight control, sensory appeal, price, familiarity, health, mood, and ethical concern was collected using a questionnaire. Metabolic syndrome was defined using NCEP ATP III definition. Independent t-test (STATA 12.0) was done to determine the difference of food choice between case and control, and linear regression test to determine the most influencing factor of food choice in people with Mets. **Results:** There was a significant difference of food choice especially in mood factors between MetS group and normal group after analyzed using T-test (p < 0.05; CI = 0.05–

0.37). Using linear regression, sensory appeal and mood were significant factors that influence the food choice leads to MetS (p < 0.05; r = −0.0147; r = 0.0191). **Conclusion:** Sensory appeal and mood were noted to be the most food choice-influencing factors of people with metabolic syndrome in Yogyakarta, Indonesia.

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Studying The Influence of Frying-Vessel and Storage Settings on Trans Fat and Oxidative Stability of The Groundnut Oil

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Keywords: Trans fatty acid · Oxidative stability · Frying
Background/Aims: Deep-fat frying results in generation of trans-fatty acids (TFA) and oxidative deterioration of the fat/oil. **Methods:** The study assessed the effect of oil-type, frying temperatures, frying-cycles, type of frying-vessel and storage conditions on TFA/oxidative stability. TFA (using gas-chromatography) and other chemical parameters (American Oil Chemists' Society official methods) were analysed for the groundnut oil used for preparing French-fries at varying frying temperatures/frying cycles in Teflon-coated non-stick vs iron frying-vessel at different storage conditions. Data were subjected to ANOVA analyses using SPSS version 21. **Results:** Compared to Teflon-coated non-stick frying-vessel, iron-vessel led to greater TFA formation across 32 frying cycles (p < 0.05). Free-fatty acid and p-anisidine values were consistently higher in iron frying-vessel (p < 0.05) while peroxide (PV) and TOTOX values indicated inconsistency. Stored oil samples (32nd frying cycle; 30 days) indicated a non-significant increase in TFA concentrations with rising temperatures (room temperature >4ºC>minus 20ºC). Oxidative parameters increased with rising storage temperatures (p < 0.05) while PV was unstable. There is a need to adopt appropriate frying practices and avoid reuse or reheating of fats/oils; and if reused, incorporating in dishes by absorption method. Used frying oils should be utilized at the earliest possible since their deterioration rate is much higher than the fresh oil; and if needed, stored at low temperatures. **Conclusion:** It is envisaged that the inclusive data generated would help immensely in the preparation of fried-food standards/regulations as well as in curbing TFA/oxidative markers of the oils used for frying.

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Analysis of Strategic Foods Self-Sufficiency in Parigi Moutong Region 2011–2015

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Keywords: Consumptionnet · Production · Self-sufficiency of strategic food

Background/Aims: Analysis of strategic foods self-sufficiency is one of the effort to support the achievement of local food security. Self-sufficiency is depend on local food production to fulfill the actual consumption their population. The general objective of this study is to analyze self sufficiency of strategic food in Parigi Moutong region from 2011–2015. **Methods:** This study used secondary data which are consumption data had been collected from SUSENAS and production of strategic foods data during 2011–2015. Processing and analysis of data were conducted in June-August 2016. **Results:** The development of strategic food's consumption were tending to increasing while the production were decreasing during 2011–2015. **Conclusion:** Calculation of sufficiency of strategic food according to net production towards consumption of population showed that commodity of strategic foods which belonged to self sufficiency category in 2011–2015 was rice. While the other commodities which were soybean, beef, and fresh fish belonged to self-sufficiency category in some year during 2011–2015. The other commodities which were chicken and eggs belonged to not self sufficiency category during 2011–2015.

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Nutritional Status, Health Status, and Quality of Life among Tea Plantation Workers in Pangalengan, Jawa Barat

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Keywords: Health status · Nutritional status · Quality of life · Women of childbearing age

Background/Aims: Anemia can decrease the health related quality of life. In addition, health-related quality of life is also affected by nutritional and health status. The objective of this study was to examine the relationship between nutritional, health, and anemia status with quality of life among tea plantation workers. **Methods:** The design of this study was a cross sectional with the number of subjects as many as 116 women of childbearing age. This research was conducted at Nusantara VIII Plantation Company (PTPN VIII) located in Pangalengan, West Java, Indonesia. Food consumption data were obtained through 2x24 hour recall and semi quantitative food frequency questionnaire, nutritional status data (Body Mass Index) was obtained through anthropometry measurement. Anemia status was obtained using HemoCue Hb 201+. Quality of life data was collected through interviews using the Medical Outcome Study 36-Item Short-Form Health Survey (SF-36). Data were analyzed using Pearson and Rank Spearman correlation test. **Results:** Most subjects were classified as having a body mass index (BMI) of > 25 kg/m^2 (overweight and obesity) (53.4%). The prevalence of anemia in this study was 28.5% with an average hemoglobin level subject is 12.6 g/dl. Most of the subjects suffered pain in the last four weeks (83.6%). Most subjects had a good quality of life with an average score of 76.3 ± 13.3. There was no significant relationship between nutritional and anemia status with quality of life. **Conclusion:** There was a positive relationship between Acute Respiratory Infection (ARI) with dimensions of physical and social function.

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Optimization of Fish Processing and Consumption in Minimizing Mercury's Impact on Human Body

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Keywords: Human body · Fish consumption · Fish processing, mercury

Background/Aims: Fish is one of our daily diets which contains high-quality animal protein and micronutrients. However, the trend in fish consumption on the daily basis has recently been less popular due to the number of issues regarding sea pollution especially in the form of mercury, which approximately polluted 2–35% of the oceans globally. Although the health benefit of consuming fish is higher than the risk of health hazards from mercury contamination, there are still many groups of people, who refrain from consuming fish and only received less than 20% of daily intake recommendations during pregnancy. This problem may be due to issues regarding the impact of mercury accumulation. **Methods:** This study uses a qualitative method and will specifically discuss an innovative way of dealing with declining fish consumption in the community. We discuss the processing method and consumption limit for various fish types, which are contaminated by mercury. The result will be socialized to the target groups. **Results:** This program can be directly implemented by the local community, in both rural and urban settings. Before the implementation, this program requires preliminary studies, which consist of population testing for target groups to assess the suitability and effectiveness of the program. **Conclusion:** This program were will be (1) increase the number of fish eaters in the regional community; (2) measure/map the safe amount of fish consumption that is indirectly contaminated by different levels of mercury.

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Adequacy of Calcium, Iron, and Vitamin B12 Intake in Vegetarian and Non-Vegetarian Women

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Keywords: Vitaminmineral · Vegetarian women · Non-vegetarian women

Background/Aims: Vegetarian diet has been linked to various health benefits. However, there are some common nutritional concerns resulting from the elimination of animal-food sources which can predispose the vegetarians to a greater risk of nutritional deficiencies, mainly include calcium, iron, and vitamin B12. The objective of the study was to assess the differences in calcium, iron, and vitamin B12 adequacy intakes in vegetarian and non-vegetarian women. The contribution of food sources to the calcium, iron, and vitamin B12 intake was also observed. **Methods:** This study was a cross sectional design conducted among women aged 20–40 years old, living in Greater Jakarta area. Calcium, iron and vitamin B12 intake was assessed using semi-quantitative FFQ distributed through online. Supplement intake was assessed. The number of subjects were 35 vegetarians and 42 non-vegetarians. **Results:** Vegetarian group had significantly higher proportion of subjects who met calcium (60 vs. 33.3%, p < 0.01) and iron (54.3 vs. 19%, p < 0.05), but lower on vitamin B12 (31.4 vs. 90.5%, p < 0.01) intake adequacy than non-vegetarian group. The category of nuts (especially tofu and tempe) and processed products was majorly contributed to calcium, iron, and vitamin B12 intakes in both groups. Vegetarians could meet their calcium and iron intake adequacy. **Conclusion:** Vegetarians need to include vitamin B12 supplement in their diet to meet the requirements. Non-vegetarians should be encouraged to increase their food intake to meet calcium and iron intake adequacy.

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Absence of Adequate Soybean Supply may Cause Opportunity Losses on Protein Intake, Total Income and Work Forces in Indonesia

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Keywords: Economic and non-economic loss · Protein intake · Soybean supply · Tempe and tofu producers

Background/Aims: Tempe is an Indonesian traditional food widely known across generations in which more than 70% of the soybean was imported. **Methods:** A landscape analysis using main secondary data from National Socioeconomic Survey by Statistics Indonesia and report of SEAMEO RECFON study in 2016 was done to calculate potential losses in the absence of imported soybean for tempe industry in Indonesia. Almost all (90%) of Indonesian people consumed tempe. In the absence of 70% of imported soybean for tempe and other soybean products, protein intake will reduce by 4.9–9.8 g/day or approximately 8.8–17.5% (Q1-Q5) of protein adequacy level. About IDR 1.3 trillions potential tax from soybean based domestic industries and IDR 41.4 trillions of net income potential of tempe and tofu industries will also be lost or the industry will work 70% under their present capacity. As many as 5,068,468 tempe industries (including tempe and tofu producers) will be closed or only work 30% of the actual capacity. Moreover, as many as 5,686,164 people will lose their jobs or 4.9 working hours will be lost. **Conclusion:** The absence of imported soybean may also reduce consumers satisfaction due to the absence of their preferred food. Health potential lost will also happen due to the absence of 70% healthy food, such as tempe and tofu, which scientifically proven to have benefit on cancer and diabetes. This implies the importance of ensuring adequate soybean supply through combination of import and local soybean production.

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Behavior Change to Achieve Sustainable Food Consumption Pattern in Indonesia

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Keywords: Behavior change · Eco-unfriendly production method · Food waste · Recyclability

Background/Aims: Committed to implement SDGs, Indonesia applies many strategies to achieve sustainable food consumption dealing with limited agricultural land, climate change and environmental degradation. **Methods:** This literature review aimed to evaluate food consumption pattern of the Indonesian people and to formulate alternatives of policy on sustainable food consumption. Various data from stakeholders, mainly Statistics Indonesia, Ministry of Agriculture and Ministry of Health of Republic of Indonesia, were used. **Results:** The current food consumption pattern was characterized by inadequate energy and protein intake level and lack of dietary diversity. Current food choice was still driven by comfort and pleasure. Food waste were highly produced during wedding party or seminar and by habit of buying raw or processed food in a large number left to rot in the refrigerator. Therefore, shifting to environmental sustainability is expected to drive food choice. **Conclusion:** The behavior change strategies are shifting: a) from quantity to quality (need-based consumption and healthy diet), b) from pleasure to environmental sustainability, c) short term to long term thinking (long durability and reuse-ability), and d) from personal interest to common interest (social, environmental, political and economic values). This study suggests intervention from government, such as enforcing specific requirements for food with environmentally unfriendly production method.

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Anemia in Pregnancy and Low Birth Weight is Associated with Birth Length among Baby in Palu and Sigi

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Keywords: Anemia · Birth weight · Birth length

Background/Aims: Prevalence of Anemia on pregnancy, Low birth weight and length infant in Central Sulawesi Province is high and Low Birth Weight (LBW) in central Sulawesi is the highest among all provinces in Indonesia. This study was aimed to know the effect of anemia in pregnancy and low birth weight on birth length among baby in Palu and Sigi. **Methods:** This study was a longitudinal with cohort design involving 104 samples using purposive sampling conducting in two district (Palu City and Sigi). 26 anemic and 26 non-anemic pregnant mother on second and third trimester in each district was chosen at baseline and followed to measured birth weight and length of babies. Hemoglobin was measured by using portable Hb meter and length was measured by using fiber lengthboard. Data were analyzed using Chi-Square with OR and independent t-test. **Results:** This study showed 18 (17.3%) infants were LBW and 59 (56.7%) infants were stunted. Among 18 LBW infants there were 15 (83.3%) infants were born from anemic mother (p = 0.004, OR = 6.6, CI 95% = 1.8–24.6) and among 59 stunted infants there were 34 (57.6%) infants were born from anemic mother (p = 0.113). Mean of birth weight and length was lower 278 g (p = 0.027) and 9.4 mm (p = 0.001) among anemic mother. Most of (94.4%) LBW infant were stunted (p = 0.001) and mean of birth length was lower 3.56 cm among LBW infant (p = 0.000). **Conclusion:** High prevalence of stunted and LBW infants in central sulawesi can be prevented by decreasing anemia prevalence among pregnant women.

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Food Security on Stunting and Not Stunting Children Family in Tualang District, Siak Regency, Riau Province

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Keywords: Toddlers · Stunting · Food security · HFIAS

Background/Aims: The purpose of this study was to determine the family food security of stunting and non-stunting children in Tualang Subdistrict, Siak Regency. **Methods:** The cross-sectional study was conducted in Tualang Subdistrict, Siak Regency, which consisted of 8 villages and one village. The study was carried out from August 2016 to April 2017. The population is 3,235, and the sample is 576 toddlers aged 0–59 months. The survey using the questionnaire of Household Food Insecurity Access Scale (HFIAS).

Family-based Family Vulnerability Access Scale (SAKPaKe) by looking one month back (last four weeks at the time the survey conducted). Data analysis using Chi-Square Test. **Results:** The prevalence of stunting toddlers is 39.6%. Families that do not hold food are 27.8%. Families that do not hold food have stunting toddlers as much as 10.1% and have stunting children as much as 17.7% while food-resistant families have stunting toddlers as much as 29.5% and have non-stunting children as much as 42.7%. **Conclusion:** Family access to food for the past one month did not affect the family food security of children under five under five. Allegedly stunting is caused by other variables not examined in this study. Further research needs to be done using different methods of food security, for example, positive deviance methods.

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Food Security Issue and Household Coping Mechanism In Fishing and Aquaculture Communities (A Case Study of Pangandaran, West Java, Indonesia)

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Keywords: Household coping mechanism · Food security · Fishing and Aquaculture Communities · West Java Pangandaran

Background/Aims: Food is a basic human need. Many communities, including the fishing and aquaculture communities, are still facing difficulty in fulfilling food sufficiency. Fishing and aquaculture households attempted coping mechanisms independently, but they are constrained by a variety of factors and thus the government should come with a help to overcome constraints. This research aims to identify problems of food security in fishing and aquaculture communities, analyze determining factors, identify attempts undertaken by fishermen and aquaculture operators, and identify relevant government roles. This research uses a case study in Pangandaran , with data collected through surveys. **Methods:** Respondents were selected purposive: 20 fishermen, 20 aquaculture operators, 20 fish processors, 20 fish traders, and two West Java Provincial Marine Fisheries Service officials. Research was carried out in April – December 2018. Household food security of fishermen/aquaculture operators was measured using a Multiple Linear Regression while government policies were identified using the Analytical Hierarchy Process. **Results:** It was detected that 60% of households were categorized as secured, 15% less secured, 15% vulnerable, and 10% unsecured. Households of fishermen/aquaculture operators responded to these conditions with a variety of coping mechanisms: allocating parts of fish production for households consumption, selling some others to buy various kinds of food, and processing some others to get added value. These coping mechanisms were constrained by a number of factors, among which and the most important ones were knowledge and skills, capital, facilities and infrastructure, and market access. **Conclusion:** Government policy, therefore, should be focused on handling these constraining factors.

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Relationship between Intake of Macronutrients and Level of Stress with Fasting Blood Sugar Level in Type 2 Diabetes Mellitus Patient

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Keywords: Diabetes mellitus · Fasting blood glucose · Macronutrients · Stress levels

Background/Aims: Diabetic is one of the degenerative and metabolic diseases known as diabetes caused by elevated levels of glucose in the blood due to lack of insulin. The largest classification of Diabetes Mellitus (DM) disease is type 2 DM. Increasing the number of people with diabetes mellitus can be caused by many factors, including excessive intake of food and stress levels. The purpose of this study was to analyze the relationship of macro nutrient intake and stress level with fasting blood sugar level. **Methods:** The research design used was cross sectional. Respondents of this study aged from early adult as many as 41 patients with diabetes mellitus in Pasar Rebo Hospital. The analysis used is Chisquare to know the relationship between variables. **Results:** The results of the study showed a significant association with fasting blood sugar levels were carbohydrate intake (p value = 0.038), and stress level (p value = 0.024). **Conclusion:** Based on the results of research, it is advisable to maintain and manage a healthy diet, stress control and regularly controls fasting blood sugar levels.

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Nutrition and Dementia Status among Elderly in Tulungagung, Indonesia

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Keywords: Nutrition status · Dementia status · Indonesian elderly · Integrated health post

Background/Aims: Increasing life expectancy of Indonesian people consequently raises the number of elderly. Problems of underweight and dementia among elderly are common in developed countries, but still little evidence in develop countries, include Indonesia. The objective of this study is to analyze the nutrition and dementia status among different age-gender of Indonesian elderly in Tulungagung. **Methods:** A crossectional study design was applied to all elderly people age 50–75 years old (n = 1312) who participated in posyandu elderly program from nine Posyandu in Tiudan Health Center, Tulungagung District, Indonesia. Nutrition status was assesed based on body mass index (BMI), and dementia status was assesed through an interview using a mini-mental state exam (MMSE). Nutrition and dementia status were assesed by local nurses and midwifes. **Results:** The results showed that 37.1% and 7.1% elderly was underweight and overweight respectively. As many as 38.1%, 10.4% and 1.7% elderly was categorized as mild, moderate and severe dementia respectively. The older the age showed a significant for the more prevalence of underweight and dementia, but less prevalence of overweight. **Conclusion:** Problems of underweight and dementia was higher among elderly women. This implies that the problem of underweight and dementia among elderly is prevalent; and program to slow down the progress of underweight and dementia is required.

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Association between Low Carbohydrate Diet Score and Metabolic Syndrome in Chinese Adults

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Keywords: Low carbohydrate diet score high fat · Metabolic syndrome · Chinese adults

Background/Aims: The association between low carbohydrate diet (LCD) score and metabolic syndrome (MetS) is lack of evidence and inconsistency. Therefore, we aim to assess the association between LCD score and MetS in a Chinese population. **Methods:** A multi-stage random sampling method was applied and A total of 1993 participants aged more than 18 years from the cross-sectional study in Nanjing were accessed. Dietary intake was evaluated with a three-day dietary recall method combined with the condiments weighing method. LCD scores, including usual, animal- based, and plant-based LCD scores, were calculated based on the energy, carbohydrate, fat, and protein intake by sex. **Results:** In multivariate regression analyses adjusted for age, total energy intake and other potential confounders, the usual LCD score significantly increased the risk of MetS in men [the highest quartile vs. lowest quartile: odds ratio (OR): 1.75; 95% confidence interval (CI): 1.07–2.87, P for trend <0.05]. Furthermore, a significant trend was found between plant-based LCD score and the MetS in men (P for trend <0.05). Among the components of the MetS, higher usual LCD score increased the risk of central obesity, hyperglycemia and hypertriglyceridemia in men, meanwhile animal-based LCD score was positively associated with the risk of central obesity, and plantbased LCD score was positively associated with the risk of hyperglycemia in men. **Conclusion:** Our results reveal that low carbohydrate and excessive fat diets (even good fatty acids), may increase the risk of MetS in Chinese male. Further studies are warranted.

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Intrauterine, Extrauterine Predisposing Factors, Oxidative Stress and Metabolic Adaptation and Cardiometabolic Risk in Stunting Children Aged 6–24 Month, Bogor City

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Keywords: Stunting · Intrauterine · Extra uterine · Oxidative stress · Cardio metabolic risk

Background/Aims: Stunting children under two years of age (U2) illustrates chronic nutritional deficiency with various predisposing factors. Chronic malnutrition causes the body to adapt and increased cardio metabolic risk (CMR)in adulthood The aim of this study was to prove differences in intrauterine predisposition (PFIntra), extra uterine (PFExtra), oxidative stress (OxS), and CMR in stunting children (StC) and non stunting children (NStC) aged 6–24 months (U6–24). **Methods:** A nested-cohort, comparative cross-sectional study was used to assess the role of PFIntra, namely maternal anthropometry before pregnancy, nutrition intake and nutritional status of pregnant women, birth weight (BW) and birth length (BL) of subjects, PFExtra namely, pediatric anthropometry and nutritional intake in StC and NStC U6- 24. Indicator of OxS was serum MDA level. The CMR indicators were waist circumference (WC), HDL-cholesterol, triglycerides. All subjects were participants in Bogor Longitudinal Study Child Growth and Development (BLSCGD), in Bogor Tengah sub-district. Univariate, bivariate and multivariate statistical analyzes were used to compare StC and NStC groups with significant p value <0.05. **Results:** There were 38 StC and 46 NStC U6- 24 fulfilled the study criteria and obtained significantly lower PFIntra in StC compare to NStC, namely the serum zinc level of pregnant women, maternal height, BW and BL subjects (p = 0.047, p < 0.001, p = 0.009, p = 0.025). Manganese intake (p = 0.007), isoleucine intake (p = 0.015). There were no significant differences in OxS between two groups. Two CMR indicators were significantly different, namely the size of WC in StC was significantly smaller, but the triglyceride level was higher in StC. **Conclusion:** PFIntra and PFExtra proved to have an impact on the incidence of stunting children U6- 24. CMR in StC have been detected in U6- 24.

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Smoking Promotes Obesity and Insulin Resistance: A Prospective Cohort Study from China

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Keywords: Smoking · Body Mass Index · Insulin resistance

Background/Aims: Although smoking leads to changes in body mass index (BMI) and insulin levels have been largely confirmed, whether smoking-caused insulin change is mediated by BMI is still unknown. This study assessed the temporal relationship between BMI and insulin and the impact of smoking on BMI-insulin association by examining a cohort study from China, a total of 3784 adults aged 20 to 74 years, with an average of 4.2 follow-up years. **Methods:** Fasting serum glucose and insulin were measured twice both at baseline and follow-up. Cross-lagged panel and mediation analysis were used to examine the temporal relationship between BMI and insulin and mediation effect of BMI on the smoking-insulin sequence. **Results:** The cross-lagged path coefficient ($\rho 2$ value) from baseline BMI to follow-up insulin was significantly greater than the path coefficient ($\rho 1$ value) from baseline insulin to follow-up BMI ($\rho 2 = 0.165$ versus $\rho 1 = 0.053$, $p < 0.001$). The path coefficient from BMI to insulin was significantly greater in smokers($\rho 2 = 0.191$, $p < 0.01$) than in non-smokers($\rho 2 = 0.160$, $p < 0.01$), with $p < 0.008$ for the difference. The mediation effect of BMI on the smoking-insulin relationship was estimated at 86.0% ($p < 0.001$) at baseline and 80.0% ($p = 0.013$) at follow-up. **Conclusion:** These findings demonstrate that elevated BMI probably precede insulin levels, and smoking could deteriorate insulin resistance through its BMI-increasing effect. The control of tobacco smoking could be a target to reduce the burden of diabetes.

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A Study of Main Food Availability and Children's Nutritional Status of Poor Household in Village Litamali Kobalima District of Malaka Regency

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Keywords: Availability of main food · Nutritional status · Children under five years

Background/Aims: The situation of food security depends on the availability of food, access to food and the use of food. The availability of food is thinned when dependent on a type of food. This study aims to assess the availability of main food and children's nutritional status of poor households in the village of Litamali Kobalima district of Malaka. **Results:** The results showed that the family had a low correlation with the positive direction to the availability of main food (r = 0.39). Maternal education has a low correlation with the negative direction of the availability of main food (r = 0.23). The type of food has a low correlation with a negative direction to the availability of main food (r = –0.28). The frequency of eating has a low correlation with the positive direction

(r = 0.35). The nutritional status has a low correlation with the positive direction to the food type (r = 0.32). There is a significant difference between the size of families with the availability of main food (ρ = 0.005). There is a significant difference between maternal education with the availability of main food (ρ = 0.013). There is a significant difference between family expenses and consumption patterns (ρ = 0.034). There is a significant difference between food financing with the nutritional status of children under five years (ρ = 0.016).

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The Incidence of Food Insecurity Through Food Access on Women's Emotional Mental Disorder in Rural Area

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Keywords: Mental emotional disorder · Food insecurity · Psychology

Background/Aims: Anxious as a sign of mental emotional disorder is one of the symptoms experienced by food-insecure people. Anxious feelings about not fulfilling daily needs can cause mental emotional disorders. If this disorder is left continuously it will cause stress and have an effect on physical health. The purpose of this study was to examine the relationship of the incidence of individual food insecurity with mental emotional disorders in rural women. **Methods:** The study design was cross sectional with a total of 146 adult women (71 non-disorder, 72 mental emotional disorders) aged 35 to 55 years. Status of mental emotional disorders used Self Report Questionnaire, while status of food insecurity at the individual level used the Food Insecurity Experience Scale (FIES). **Results:** The result showed that FIES questions could be used well in the target group (reliability>0.07). Moreover, data showed that 45.4% of respondents had no indication of food insecurity, 28.7% of respondents were of mild level food insecurity, 16.8% of respondents were of moderate level food insecurity, and 9.1% of respondents were of severe food insecurity.The bivariate test results showed that there was a relationship between moderate level of food insecurity with the incidence of emotional mental disorders (p < 0.05). **Conclusion:** It was known that people who had feel difficulties in accessing food in moderate level has OR 4,138 at risk of developing mental emotional disorder than people who have no difficulty food access. Further research really needs to be encouraged to know things that cause mental emotional disorders in terms of food access.

Household Food Security, Child Overweight and Inadequacy of Vitamin a and Iron among Left-Behind Children in Labour Migration Pocket Area

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Keywords: Food security · Obesity · Iron · Vitamin A

Background/Aims: Studies showed that double burden of malnutrition is associated to food insecurity. One among coping strategies to food insecurity is migration. This analysis is aimed to test association between household food security with child overweight and risk of inadequate intake of vitamin A or iron in labour migration pocket area. **Methods:** Analysis of data from a cross sectional study conducted in labor-migration pocket area of Tulungagung District, Indonesia in 2010 is performed. Sample size was 157 randomly selected children aged 2–5 years old who left by the mothers to work abroad. Household food security was assessed by using the US Household Food Security Survey Module (US-FSSM). Micronutrient intake, i.e. vitamin A and iron were calculated by using repeated 24 hours food recall method. Risk of inadequate intake were defined when they were less than the estimated average requirement. Chi square test were done to analyze association of household food security status with overweight and one of micronutrient inadequacy. **Results:** As much as 24.8% households were food-insecure. Significant association was found between household food security status and overweight-vitamin A inadequacy (fisher's exact test, p < 0.05) However, there was no significant association between household food security status and overweight-iron inadequacy, even-though higher percentage of children with overweight and inadequate iron were found in food insecure households. **Conclusion:** Issue of hidden hunger need to be explored when relates household food security and nutritional issues of children from heavy out migration area, since they were at risk of lacking proper child-feeding which may influence their dietary quality.

Obesity as a Risk Factor for Diabetes Mellitus at The Age of Young Adults in Indonesia

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Keywords: Obesity · Diabetes mellitus · Indonesia

Background/Aims: Diabetes Mellitus (DM) begin to increase in some rural and urban areas. In 2030, there are 12 million people will estimate to be DM in Indonesia (6th rank of the world). The current epidemiological report was required to get suitable prevention programme. Objective: To determine the prevalence and risk factors for Diabetes Mellitus in Indonesia. **Methods:** Further analysis of secondary data from Basic Health Research 2013 with cross-sectional design. Samples were men and women aged 20–49 years as many as 15,307. Anthropometric data collection using dig-

ital scales instruments, height measuring instruments and medline abdominal circumference measuring devices. Diabetes mellitus is measured based on two-hour postprandial test. Risk factors are tested using logistic regression. **Results:** The prevalence of DM aged 20–49 was 8.5% and 74.9% of them did not know that they had DM. Age 30–39 has a risk of 1.77 (95% CI: 1.37–2.29) times suffering from diabetes, and 3.06 (95% CI: 2.39–3.39) times at the age of 40–49 years. DM began to appear in the Body Mass Index (BMI) ≥23 (OR 1.46; 95% CI: 1.25–1.69) and in obesity (IMT≥25) 1.57 (95% CI: 1.36–1.81) time. Central obesity is at risk of 1.69 (1.45–1.96) times affected by DM. The risk of developing DM does not differ based on economic level in urban or rural areas. **Conclusion:** Diabetes Mellitus begins to appear in young adults. Central obesity and obesity are risk factors in both urban and rural areas without distinguishing economic levels.

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Relationship between Nutrition Intake and Nutrition Status with the Incidence of Hypertension in the Elderly

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Keywords: Nutrition intake · Nutrition status · Hypertension · Elderly

Background/Aims: Hypertension is a cause of high mortality. The prevalence of hypertension tends to increase along with the increasing number of elderly people. According to Riskesdas (2013), the province of Central Java has a relatively high number of elderly population at 12.59%. The prevalence of hypertension in the elderly is 55.7%. Changes in nutrition status and unfavorable nutrition intake such as high fat, sodium, and low micronutrients (potassium, calcium, magnesium) have an effect on the incidence of hypertension. The purpose of this study was to determine the relationship between nutrition intake and nutrition status with the incidence of hypertension in the elderly. **Methods:** This study was a quantitative study with observational analytic methods conducted in the Surakarta. The design of this study is cross-sectional. The sampling method was purposive sampling, which amounted to 200 people. Data on nutrition intake using 24-hour recall, nutrition status data using body mass index (BMI), and blood pressure measured using a spighmomanometer. **Results:** Based on the results of the analysis, this study shows that there are variables that are significantly associated with hypertension, sodium intake (OR: 3.43; 95% CI: 1.09–10.77), potassium (OR: 0.24; 95% CI: 0.07–0.84). There was no significant correlation (p > 0.05) identified for fat intake, calcium, magnesium. **Conclusion:** From the results of this study it can be concluded that high sodium intake is a risk factor for hypertension and high potassium intake reduces the risk of hypertension.

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Relationship between Salt Intake Habits, Support of Posyandu Community Institution and Monitoring Nutritional Status with Hypertension in the Elderly

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Keywords: Salt intake · Nutritional status · Hypertension · Elderly

Background/Aims: Hypertension is a disease that causes high mortality rates. The prevalence of hypertension tends to increase along with the increasing number of elderly people. According to Riskesdas (2013), the province of Central Java has a relatively high number of elderly population at 12.59%. The prevalence of hypertension in the elderly is 55.7%. The purpose of this study was to determine the relationship of salt intake, the support of posyandu community institutions and monitoring nutritional status with the incidence of hypertension in the elderly. **Methods:** This research is quantitative research with analytic observational methods. The design of this study is cross-sectional. The sampling method was purposive sampling, which amounted to 200 people. The instruments of this study were food recall, interviews, and body mass index (BMI) measurements. **Results:** Based on the results of the analysis, this study showed that there was a significant relationship between the ability of salt intake, the support of posyandu community institutions and monitoring nutritional status with the incidence of hypertension in the elderly. **Conclusion:** From the results of these studies it is expected that health workers in providing health services must be maximally and also pay attention to nutritional intake and nutritional status of the elderly.

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Relationship between Salt Intake with Hypertension in The Elderly

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Keywords: Salt intake · Hypertension · Elderly

Background/Aims: Hypertension is a disease that causes high mortality rates. The prevalence of hypertension tends to increase along with the increasing number of elderly people. According to Riskesdas (2013), the province of Central Java has a relatively high number of elderly population at 12.59%. The prevalence of hypertension in the elderly is 55.7%. The purpose of this study was to determine the relationship of salt intake with the incidence of hypertension in the elderly. **Methods:** This research is quantitative research with analytic observational methods. The design of this study is cross-sectional. The sampling method was purposive sampling, which amounted to 200 people. The instruments of this study were food recall and interviews. **Results:** Based on the results of the analysis, this study showed that there was a significant relationship between salt intake with the incidence of hypertension in the el-

derly. **Conclusion:** From the results of these studies it is expected that health workers in providing health services must be maximally and also pay attention to nutritional intake of the elderly.

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The Associations between Lifestyle Factors and Subjective Health

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Keywords: Subjective health · Lifestyle factors · Nutrition survey

Background/Aims: Although subjective health is known to be a useful health assessment index to predict survival prognosis, the relationship between subjective health and lifestyle factors remains unknown. This study aimed to determine the association between lifestyle factors and subjective health among community-dwelling adults. **Methods:** We used data from 6,375 adults aged 20 years and older obtained from the cross-sectional Shiga Prefecture Health and Nutrition Survey, 2015. A health behavior score was created based on five lifestyle-related factors: diet quality, smoking, alcohol drinking, exercise, and sleep. The score ranged from zero to five. Subjective health was classified into two groups: a "good group" and a "poor group." **Results:** The association between health behavior scores and self-rated health was examined with a logistic regression analysis adjusted for potential confounding variables. In total, 2,524 (39.6%) subjects reported good subjective health. Individuals with health behavior scores of three, four, or five had a higher subjective health than individuals with health behavior scores of zero or one. Moreover, as this score increased, subjective health also increased significantly. This is the first study to quantify the combined effect of lifestyle-related factors on subjective health in a Japanese population. **Conclusion:** A healthier lifestyle, including having good exercise habits, obtaining adequate sleep, not smoking, not consuming too much alcohol, and consuming sufficient recommended nutrients was associated with an incremental improvement in subjective health. This study suggests that a comprehensive approach to lifestyle habits could lead to improved subjective health and decreased mortality in the future.

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Food Insecurity, Homestead Food Production and Source of Food at The Borderline of Indonesia, Study Case: Sambas Districts, West Kalimantan

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Keywords: Food security · Insecurity · Homestead food production

Background/Aims: Food insecurity remains problems in many areas of Indonesia including the borderline areas. This study would like to assess food insecurity and the homestead food production in Sambas District, West Kalimantan, as borderline area. **Methods:** This study was a follow up study from a cross sectional study to pregnant mothers conducted in 2016. Among 559 subjects, 484 could be followed up and continue become subject of the study. **Results:** There were 18.8% household categorized as food insecure, while other were food insecure with marginal, low and very low food insecure (22.5%. 46.7% and 12% respectively). The finding is in line with the food source of household where many households fulfill their food buy purchasing from domestic market (vegetables, fruit, poultry, livestock and meat: (86.3%, 75.7%, 84/8%, and 82.1% respectively). In the contrary, 40.3% of Households grew vegetables, 53.9% owned fruit tree, 55.4% raised poultry. There were only 4.1% household raising livestock. **Conclusion:** There were high prevalence of food insecure households. Purchasing food as main food source in the household while households have ability to grow or raise their food source were finding that could be assessed further.

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Dynamics of Food Consumption Patterns in The Provinces of West Sumatra, D.I. Yogyakarta and East Nusa Tenggara

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Keywords: Food consumption pattern · Food expenditure · Food security

Background/Aims: The study aims to analyze the dynamics of household consumption patterns and its implications to improve the quality of food consumption in West Sumatra, West Java, DI Yogyakarta (DIY) and East Nusa Tenggara (NTT) Provinces. **Methods:** Statistic descriptive was used to analyse changes in household food expenditure, energy and protein consumption, level of participation and food consumption in the four selected provinces. Susenas data for 2002–2014 were grouped into rural-urban areas, low-mddle-high income, and food security levels. **Results:** The results show that there was a decrease in the share of food expenditure. The highest decrease found in West Java and in the low-income houssholds, while the lowest was found in DIY and in high-income household. The energy consumption in all

provinces did not meet the recommendation. Contrary, protein consumption in all provinces met the recommendation, particulary in urban, middle- and high-income households. There was an increase in the proportion of food-insecure households in four provinces, except in DIY, specifically in rural, low- and middle-income households. Moreover, the level of participation in rice, corn, soybeans, sugar, cooking oil, and beef consumption decreased. However, there was an increase in the level of participation for chicken, fish, shallots, and chili consumption. **Conclusion:** An integrated food policy and program is needed to improve the quality of household food consumption. It should cover the production, distribution, and consumption of various food sources based on local resources and in line with government efforts to promote diverse, nutritious and balanced food consumption.

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Associations of Knowledge, Attitude and Practices (KAP) of Food Label on Cardiovascular Diseases (CVD) Risk among University Students in Selangor

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Keywords: Food label · Obesity · Central obesity · Hypertension
Background/Aims: Diet and lifestyle have changed rapidly over the years and also cardiovascular diseases (CVD) deaths were on the rise especially in developing countries. However, this accelerating economic transition in Malaysia has been accompanied by high prevalence of CVD risk factors which accounts to 35% of total deaths in 2016, and showed an increasing trend involving not only the elderly but also the young adults. Food label reading is reported to be one of the key to help individual adopt healthy food choice and dietary habits. Hence, the primary aim of this study is to find out the associations of Knowledge, Attitude and Practices (KAP) of food label usage and understanding on CVD risk amongst university students. A cross sectional study will be conducted on 389 university students in Selangor. Participants' recruitment are to be targeted on Malaysian students aged between 19 years old till 35 years old. Socio-demographic profile, nutrition knowledge, attitude, and practice of food label will be collected using self-administrated questionnaires. Data obtained will be analysed using Chi-Square test. Besides, anthropometric data of participants will be measured using TANITA weighing scale, SECA measuring tape, and SECA 213 collapsible stadiometer whereas blood pressure will be measured using Omron blood pressure monitor. All the measurements will be taken twice and the average reading will be considered. Outcome or Implications: It is expected that there is a significant association between nutrition knowledge, attitude, and practices of nutrition label and selected CVD risk factors.

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Nutritional Behavior Balanced, by The Economic Based Life Quality Elderly in Wonogiri, Indonesia

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Keywords: Nutritional behavior balanced · Economic status · Indonesian elderly · Integrated health post
Background/Aims: Increasing life expectancy of Indonesia causes increasing the number of Indonesian elderly. Problems of malnutrition and economic among elderly are cammon in developed countries, but little evidence in developing countries, especially in Indonesia. The objective of this study is to analyze the nutritional behavior balanced and ekonomic status among different of Indonesian elderly in Wonogiri. **Methods:** A crossectional study design was applied to all elderly aged more than 60 years (n = 1301) who participated in elderly program of Posyandu from Posyandu in Wonogiri 1, Wonogiri 2 and Purwantoro health center, Wonogiri District, Indonesia. Nutritional Behavior Balanced was assesed based on food 24-hours recall and food frequency questionnaire; and economic status was asseses through an interview. **Results:** Meeting the diet and nutrition needs of older people is therefore crucial for the maintenance of health, functional independence and quality of life. The elderly represent a social participation class that should not be neglected. **Conclusion:** Therefore, it is necessary to support health promotion policies and increase institutional improvement by reflecting the nutritional behavior balanced and level of economic activity of the elderly.

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The Right-Wing of Fly (*Musca domestica*) as A Neutralization of Drinks Contaminated by Microbe

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Keywords: Neutralization · Drinks · *Escherichia coli*
Background/Aims: Rasulullah Shallahu'alaihiwassalam said, "*if a fly falls in the vessel anyone of you, let him dip all of it (in the vessel) and then throw it away, for in one of its wings has the ailment and the other has the cure*" (Al-Bukhari). This hadith creates controversy because in general flies are a vector for the spread of disease from dirty places to food or drinks. Therefore, the research was conducted on right-wing of fly (*Musca domestica)* as neutralization of drinks contaminated by a microbe. **Methods:** This research used the method of Complete Random Design by 5 treatments and 2 repetitions. The treatment was done by sterilized water (positive control), drinking water added to the bacteria *Escherichia coli* (negative control), and drinking water contaminated by *Escherichia coli* bacteria with the addition of 1, 2, and 3 flies right-wings. The research began with taking the right-wing of fly and continued with the dilution of *Escherichia coli* culture tubes up to 6 times. The bacterial culture inoculation was carried out using Pour Plate method on *Eosin Methylene Blue* which is incubat-

ed for 12–48 hours at a temperature of 37o C. Data retrieval is done by observing the calculation of the number of microbes using a colony counter every 12 hours. **Results:** The data which obtained for 48 hours incubation show "0" as the result, that cannot be analyzed with SPSS. **Conclusion:** The result indicates the microbial development does not occur on contaminated drinks by addition with right-wing of *Musca domestica.*

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A Study on Heavy Metal Contamination in Seaweed and Seaweed Processed Goods

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Keywords: Seaweed · Seaweed processed goods · Heavy metals · Risk assessment

Background/Aims: In this study, the contamination of the 4 types of heavy metals(lead, cadmium, arsenic, mercury) were monitored in 93 seaweeds and their processed goods. And a food safety assessment were also carried out for these heavy metals. **Methods:** Lead, cadmium and arsenic were analyzed by ICP-OES and mercury was analyzed by mercury analyzer. The detection range of heavy metals were found as follows; Pb (N.D~0.802 mg/kg), Cd (N.D~0.809 mg/kg), As (0.134~17.296 mg/kg), Hg (0.0005~0.0331 mg/kg). **Results:** Pb and Hg were no significant differences by seaweed type but Cd and As were significantly higher in seaweed fusiforme and undaria pinnatifida sporophyll(p < 0.05). Food safety assessment from seaweeds intake were compared to PTWI (Provisional Tolerable Weekly Intake), PTMI (Provisional Tolerable Monthly Intake), and MADL (Maximum Allowable Daily Body Load) set by JECFA (Joint FAO/WHO Expert Committee on Food Additives). Pb and Hg were 0.206%, 0.036% of PTWI respectively, Cd was 2.251% of PTMI and As was 0.686% of MADL. **Conclusion:** Therefore, it was found that heavy metals from seaweeds intake were low and safe for consumption.

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Examination Concerning Indicators for Body Sex and Body Mass Index Differences in The Association Between Serum 25-hydroxyvitamin D and Pulse Pressure in US Adults ≥50 Years

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Keywords: Vitamin D · Pulse pressure · Sex · Body Mass Index

Background/Aims: Several studies reported that vitamin D improve endothelial function and inversely associated with vascular stiffening. Pulse pressure (PP) is a simple indicator of arterial stiffness. However, none of the prior studies were to elucidate the association between vitamin D and PP and to determine whether sex and body weight influences their association. Therefore, we investigated associations between the vitamin D and PP and evaluated those associations as they may differ according to sex and BMI. **Methods:** The present study analyzed data from 2,316 men and 2,249 women ≥50 years old who participated in the National Health and Nutrition Examination Survey (NHANES) 2007–2010. PP was calculated as the difference between systolic blood pressure (SBP) and diastolic blood pressure (DBP). PP of 60 mm Hg or higher was defined as high PP. **Results:** We found that vitamin D is significantly and inversely associated with lower PP and SBP in US adults ≥ 50 years. Also, higher total 25(OH)D concentrations were associated with a gradually lower ORs for high PP. When stratified by sex and BMI, these associations were stronger in men with BMI <25 compared with in men with BMI ≥ 25. **Conclusion:** Sufficient vitamin D status could effectively reduce the risk of high PP and blood pressure in US adults ≥ 50 years. Particularly, in men with BMI <25, these associations were stronger.

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Examination Concerning Indicators for Body Composition and Nutritional Status in Each Category of Functional Assessment Staging (FAST) among Older People with Alzheimer's Disease

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Keywords: Functional assessment staging · Alzheimer's disease · Nutritional status

Background/Aims: The number of the elderly dementia patients is estimated to exceed 7 million in 2025, that is one in five of the elderly, and as such, dementia has become a common disease in Japan. This study targeted institutionalized elderly people with Alzheimer's disease (AD) to obtain basic data for examining appropriate methods of diet support and intervention by clarifying the differences in body composition and nutritional status according to severity of dementia. **Methods:** A total of 163 AD patients who were hospitalized in dementia wards, or were residents of institutions or group homes were enrolled. Survey items included basic information, FAST, BMI, SMI, FMI, FFMI, CC, MNA®-SF, dietary variety, appetite and activities of daily living. **Results:** The numbers and percentages of FAST1, 2, 3, 4, 5, 6 and 7 older persons were found to be 0: 0%, 8: 4.9%, 11: 6.7%, 15: 9.2%, 18: 11.0%, 51: 31.3% and 60: 36.8% respectively. Significant differences were observed in terms of BMI, SMI, FFMI, MNA® -SF, DVS, CNAQ, and CC. **Conclusion:** In elderly people with AD, evaluating their physical conditions on the basis of BMI alone has limitations from the viewpoint of accuracy of evaluation of body composition. Thus, detailed evaluation of body composition will contribute to the quality of prognosis in these patients.

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Dietary Diversity, Major Depression, and Suicide Rate by a 20-Year Global Comparative Study

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Keywords: Dietary diversity · Major depression · Suicide · Global statistics · Longitudinal study

Background/Aims: In modern society, depression and suicide are major problems. Recently, the possibility that mental health is closely related to dietary habit has been reported. In this research, we aimed to clarify the association of dietary diversity with major depression and suicide rate for 20 years in the world using international statistics. **Methods:** Data of suicide and major depression by country were derived from the Global Burden of Disease (GBD) 2017 database. Average food supply (g/day/capita) and energy supply (kcal/day/capita) by country, excluding loss between production and household, were obtained from the Food and Agriculture Organization of the United Nations Statistics Division database (FAOSTAT). Each food was sorted across 12 food groups, and dietary diversity was obtained from food groups using the Quantitative Index for Dietary Diversity (QUANTIDD). The longitudinal associations between QUANTIDD, suicide and depression were examined in the 138 countries with populations of 1 million or greater. **Results:** Longitudinal analysis showed that the prevalence of major depression was significantly negatively associated with QUANTIDD during the 20-year study period controlled for covariates ($\beta = -387.6 \pm 98.8$, $p < 0.001$) by mixed effect model. Longitudinal association of QUANTIDD with the rate of suicide controlled for covariates was also significantly negative ($\beta = -8.40 \pm 2.27$, $p < 0.001$). **Conclusion:** Lower rate of major depression and suicide were expected in the countries with greater dietary diversity after controlling for socioeconomic indicators.

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Qualitative Exploration on The Contributing Factors of Household Food Insecurity among Orang Asli in Peninsular Malaysia Under Cash Economy

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Keywords: Contributing factors · House hold food insecurity · Orang Asli · Cash economy

Background/Aims: Orang Asli was known as a marginalized group under 10th Malaysia Plan (2011–2015) and that enviably exposed them towards the household food insecurity. Despite that, to date, little is known about the household food security condition among Orang Asli especially regarding their adaptability in the food seeking activities within the modern economic system. Therefore, the present study was conducted to explore the perceived contributing factors of household food insecurity among Orang Asli in Peninsular Malaysia. **Methods:** The qualitative study involved 61 mothers from three main Orang Asli ethnic groups from three purposively selected districts across three states in Peninsular Malaysia. The semi-structure in-depth interviews were conducted with the aid of interview protocol to gather opinions pertaining to their hardship in purchasing food from markets. The thematic analysis was performed during data analysis. **Results:** The perceived contributing factors for household food insecurity among Orang Asli included socio demographic factors (low pay and impermanent job, care for little kid, irregular food aid, no transport, and lack of food storage facilities), economic factors (high price in petrol, non-food necessities, and transport fare), and geographical factors (no grocery shop within walking distance, sudden closure of nearby grocery shops, higher price at nearby grocery shops, nearby grocery shops cannot fulfill demand, and dissatisfactory road condition). **Conclusion:** In conclusion, the perceived contributing factors towards household food insecurity among Orang Asli should be given necessary attention from local authorities in order to understand the needs of the affected community so that counter strategies can be planned to reduce their burdens.

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Depression and Dietary Antioxidant Intake are Inversely Associated with Nutritional Status in Karawang Adolescents

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Keywords: Depression dietary intake · Nutritional status · Adolescent

Background/Aims: Overweight was a risk factor for NCDs (Non-communicable Diseases). In Indonesia, prevalence of adolescent overweight was increasing along years. The previous studies showed that many factors that correlated with adolescent nutritonal status. The human recources development is depend on adolescents, especially in Karawang, as a industrial city. Therefore, we aimed to test the association between sociodemographic charateristics, depression and nutrient intake with nutritional status in Karawang adolescents. **Methods:** This study was conducted in Karawang, West Java at July-October 2018. We used cross-sectional study. The subjects were Senior High School students. The subjects (n = 66 subjects) were selected by purposive sampling. The inclusion criteria were <19 y-old adolescents who was in healthy status, and also not on diet program or fasting. We used Self Reporting Questionnaire-20 (SRQ-20) WHO for depression status and food recall 24-H for nutrient (energy, protein, fat) and dietary antioxidant intake (vitamin C and total flavonoid). Odds ratios (ORs) and 95% confidence intervals (CIs) were estimated using logistic regression analysis. **Results:** There were no association between sociodemographic charateristics and nutritional status. An

inverse association was found between depression (OR, 6.59; 95% CI, 1.535–28.124; p-value = 0.011) and vitamin C intake (OR, 8.338; 95% CI, 1.390–50.032 for the adequate vs. the non-adequate intake; p-value = 0.04) and the nutritional status. **Conclusion:** The depression and vitamin C intake was inversely associated with nutritional status in Karawang adolescents. This problem should be solved by the collaboration of improvement healthy lifestyle and adolescent psychological assistance.

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Relationship Between Fulfilling Healthy Food, Physical Activities, Cognitive Functions with Incidence of Anemia in Elderly

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Keywords: Nutrition · Physical activity · Cognitive functions · Anemia · Elderly

Background/Aims: According to World Health Organization (WHO) estimations, elderly people are expected to constitute 30–40% of the population in 2025–2050. As many as 11% of men and 10.2% of women aged 65 years over are experience of anemia. Anemia is associated with changes in quality of life, increased risk of falls, morbidity and mortality, and decreased cognition and functional ability. Functional ability includes physical and cognitive functions. Anemia in the elderly is because lack of calories, protein, iron, vitamin B12, deficiency of folic acid. Definition of anemia according to the WHO is if Hb levels <13 g Hb/ dL in men and Hb levels <12 g Hb/ dL in women. The purpose of this study was to determine the relationship fulfilling healthy food, physical activities, cognitive functions with incidence of anemia in the elderly. **Methods:** This research method used is analytic observational, cross sectional study design, purposive sampling totaling 200 people. **Results:** The results show that 91% of the participants had inadequate food intake. The average haemoglobin level among the anemic population was 10.4 g/dL compared with 13.6 g/dL among the non anemic population; a statistically significant difference. In anemic elderly, the dependency for daily activities that require physical effort was higher compared to the non anemic. The Mini Mental State Examination (MMSE) score in anemic elderly was lower than subjects who had normal hemoglobin levels. **Conclusion:** The conclusion is that a significant relationship between fulfilling healthy food, physical activities, cognitive functions with incidence of anemia in the elderly.

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Introductions of Innovative Food Supplements in Asia Pacific Region

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Keywords: Medical foods, Supplements, Market entry

Medical foods describe a class of formulated foods that target nutritional pathways of specific diseases, including neurological disorders and general physiological disorders like hypertension or inflammation, as well as ailments such as food intolerances or fatigue. Sitting at the confluence of pharmaceutical drugs and the food industry, 'nutraceuticals' are an emerging treatment protocol whose therapeutic potential and distribution channels are not widely understood. Industry analysts predict strong growth in the medical food industry in Asia-Pacific due to a rise in aging population, and a growing demand for personalized medicine. IQVIA regularly conducts market assessments for the launch of medical food products in this region, including China, Korea, Japan, Hong Kong, Singapore, Malaysia and Australia. First, IQVIA prioritizes markets based on needs for these medical food innovations. IQVIA conducted interviews with regulators, physicians and other industry experts to understand the drivers of consumer behavior and ease of introducing an innovative medical food. Subsequently, IQVIA evaluates the distribution models and manufacturing options available. This presentation will provide an overview of the unique regulatory, commercial and behavioral market dynamics in the region while providing examples of the immense diversity in the medical food market. The goal to provide recommendations and a strategic view of introductions of innovations in food supplementation by market.

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Equivalence Test between the Physicochemical Properties of Transgenic and Non-Transgenic Soy Flour

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Keywords: Physicochemical · Transgenic and Non-transgenic · Soy Flour

Background/Aims: Soybeans are a source of plant-based protein with a fairly complete composition of essential amino acids. Most of the soybean raw material in Indonesia originates from the United States of America where around 75% of the soybeans are transgenic soybeans (Roundup Ready GMO). One of the easily produced and practical soybean products is soy flour. The purpose of this study was to compare the physicochemical properties of flour made from three types of soybeans: local soybeans, imported transgenic soybeans, and

imported non-transgenic soybeans. **Methods:** The study was conducted in two phases: the preliminary study, where the physicochemical properties of the three varieties of soybeans were assessed, and the main study which involved the production of soy flour and the analysis of their physicochemical properties. **Results:** The results of the preliminary analysis revealed that the local soybeans had greater length and width dimensions, volume, bulk density, 100-seed weight, and protein content than transgenic and imported non-transgenic soybeans. The statistical analysis demonstrated that soybean variety had a significant effect on the physicochemical properties of the flour produced, namely the yield, color, water activity, bulk density, repose angle, moisture, ash, protein, fat, and mineral content, and the antioxidant capacity parameters. On the other hand, soybean variety did not have a significant effect on the carbohydrate and total phenolic content. **Conclusions:** Based on the physicochemical properties, local soy flour had a number of properties that were equivalent to those of imported soy flour and was even superior in its protein content and antioxidant capacity.

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Prevalence and Risk Factors of Low Body Weight among 45 Years Old and Residents in General Rural Areas in 2010–2012 in China

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Keywords: Middle-aged and elderly people · low body weight · Dietary · Lifestyle

Background/Aims: To know the prevalence of low body weight among middle-aged and elderly people in general rural areas of China and investigate the influence factors. **Methods:** A total of 25 464 participants who were 45 years old and above from 2010–2012 China National Nutrition and Health Surveillance as subjects to investigate the prevalence of low body weight. For 545 low body weight participants, we performed 1:2 case-control study to investigate the influence factors. The content of survey included 3-condecutive days-24-hour dietary recall, physical examinations, physical activity and social economic factor. **Results:** The prevalence of low body weight among middle-aged and elderly people was 5.27%, 5.52% for male and 5.05% for female. The prevalence of low body weight increased with the age ($P < 0.01$). The daily intake of energy, total proteins, high quality proteins, fat and fruits were lower in low body weight than normal body weight among middle-aged and elderly people ($P < 0.01$), however, the consumption of smoking and alcohol were higher in low body weight than normal body weight ($P < 0.01$). Multivariate conditional logistic regression analysis showed that the daily intake of total proteins, vegetables and fruits were protective factors and unhealthy lifestyle such as smoking were risk factors among low body weight people. **Conclusion:** The prevalence of low body weight at a higher level among middle-aged and elderly people in general rural areas of China. It is necessary to promote the middle-aged and elderly people to increase the consumption of high-protein foods, vegetables and fruits, quit smoking and control drinking.

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Assessment of Diet Quality, Physical Activity and Weight Status among Students of Program Pendidikan Khas Integrasi (PPKI) in Selangor

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Keywords: Learning disabilities · Weight status · Diet quality · Physical activity

Background/Aims: Children with different conditions of learning disabilities to an extend are vulnerable of overweight/obesity due to adoption and exposure of various lifestyle practices and behavioural risk factors. Therefore, this research's aim was to assess weight status of the children and their association with diet quality and physical activity. **Methods:** A cross-sectional survey was conducted via anthropometric measurement of 360 learning-disabled children in Program Pendidikan Khas Integrasi. Scoring of the children's dietary intake quality was aided with Food Frequency Questionnaire administration while Diet Quality Index-International was used as nutrient scoring guideline and Physical Activity Questionnaire for Children was used to determine physical activity levels. Data obtained was analysed using Nutritionist Pro Software and SPSS version 21. **Results:** Children with learning disabilities were at normal weight status (52.8%) but prevalence of underweight and obesity were 11.6% and 35.5% respectively. Learning-disabled children charted in 'Needs Improvement' diet quality (59.4%) meanwhile 49.7% of them engaged moderate physical activity. There was significant relationship between physical activity levels with weight status and diet quality with physical activity levels (r = –0.124, p > 0.018 & r = 0.154, p < 0.003 respectively) but no correlation was found between diet quality with weight status (r = 0.010, p > 0.844). **Conclusion:** The prevalence of weight status among learning-disabled children was normal and could be influenced by moderate physical activity performance. However, other factors such as children's dietary pattern, learning disorder severity and mother's food preferences are not to be excluded and future research are in need on the aforementioned factors.

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A Case Control Study: Comparison of Nutrition Habits of Healthy Individuals with Coronary Artery Patients

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Keywords: Coronary artery disease · Dietary habits · Smoking · Alcohol

Background/Aims: Coronary artery disease (CAD), one of the most important chronic diseases of adulthood, is the most common cause of mortality and morbidity in all over the world. The aim of this study was to comporison of the dietary habits of coronary artery patients diagnosed in Cardiology Outpatient and

healthy people. **Methods:** This study consisted of 44 people who who were diagnosed with CAD and accepted to participate in the study. Additionally, 44 people without the diagnosis of CAD who applied to the same polyclinic were evaluated habits were evaluated. Socio-demographic characteristics of patients consumed per week from each food item in the last month (eg 100 grams of red meat = 1 serving), questions were collected with the help of a questionnaire. **Results:** 46.6% of the participants were mildly overweight and 27.3% were obese. 59.1% of the patients were male and 40.9% were female. Egg, cheese, bread, French fries and alcohol consumption portions of the group with CAD were significantly higher in the non-CAD group (p < 0.05). In addition, the presence of an additional chronic disease in the CAD group compared to the non-CAD group was significantly higher in cigarette smoking and higher cholesterol levels (p < 0.05). **Conclusions:** Patients with coronary artery disease are more likely to eat bread, eggs, cheese, fries and alcohol than those without. In addition, patients with coronary artery disease are more likely to smoke and have higher cholesterol levels.

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Development of High Protein Soy-Based Powder Formula for Beverage to Mimic Dairy Milk

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Keywords: High protein · Soy-based · Dairy milk

Background/Aims: The objective of the study was to assess body fat percentage and energy intake of women in Karawang district. **Methods:** The study was part of a bigger study assessing the nutrient density between normal and obese women in Karawang district. The subjects were women aged 18–39 years old (n = 51 normal and n = 50 obese) recruited using convenience sampling. Normal was defined as those with BMI 18.5 <25 kg/m^2; while obese was BMI ≥30 kg/m^2. Body composition was measured using TANITA DC-360P and height using SECA No. 213. A one day 24-hr recall was employed to assess energy and nutrient intake. **Results:** All women in obese group had body fat percentage ≥ 39%; while 55% of women in normal group had body fat percentage ≥ 33%. Women in normal group had significantly higher percentage of muscle mass than those in obese group (63.3 ± 3.7 vs. 48.8 ± 3.6%, p < 0.01). The total energy intake was not significantly different between groups (mean±SD: 1825 ± 639 kcal); but obese group had significantly lower energy intake from protein (12.1 ± 3.4 vs. 14.0 ± 3.4% energy, p < 0.01) and higher energy intake from carbohydrate (61.2 ± 11.5 vs. 56.5 ± 11.6% energy, p < 0.05). The obese group had significantly higher percentage who did not meet the Acceptable Macronutrient Distribution Range (AMDR) than the normal group (70 vs. 43.1%, p < 0.05). **Conclusion:** Majority of women with normal BMI level had body fat percentage higher than ideal indicating an obesity. Normal and obese women are encouraged to meet the AMDR of energy intake.

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Fast-Food Consumption and Its Association with Diabetes and Impaired Glucose Control in Chinese Adults-The China Health and Nutrition Survey

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Keywords: Fast food consumption · Diabetes · Impaired glucose control · Adults

Background/Aims: The study aimed to assess the prospective association of diabetes and impaired glucose control with fast food consumption. **Methods:** A total of 8,690 adults aged 18 years and over from nine provinces participating in the China Health and Nutrition Survey between 2004–2009 were included in this analysis. Regression analysis of fast food consumption with diabetes and impaired glucose control, using data obtained from repeated diet and health surveys in an open longitudinal cohort. **Results:** In total, 11% and 38% adults had diabetes or impaired glucose control in 2009. Younger or male adults or those living in urban areas, or having higher education attainment, or higher income had higher consumption than their corresponding counterparts. Compared with non-consumers, the odds ratios (95% CI) for diabetes were 1.29 (1.06–1.54) and 1.42 (1.10–1.84) among those who consumed fast food <50 g/day and >50 g/day, respectively. The corresponding odds ratios (95% CI) for impaired glucose control were 1.35 (1.19–1.53) and 1.69 (1.41–2.02). Over the study period, Chinese adults had increased fast food consumption. The increase was significantly higher among those younger males, living in urban areas, attaining higher education or higher income. **Conclusions:** Fast food consumption was associated with the emerging diabetes epidemic.

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Survey on Mastication among Nursery School Children: Comparison Between 2011 and 2016

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Keywords: Children · Family · Mastication

Background/Aims: Due to the rationalization and simplification of current eating habits, the number of nursery school children who "cannot bite" has increased, leading to the concern that their masticatory ability will decline. Therefore, the actual situation regarding the dietary habits of nursery school children was investigated in 2011 and 2016. **Methods:** A questionnaire survey on mastication was conducted on parents of young children attending all public nursery schools in city A in Hyogo Prefecture, Japan (each about 600 persons). The questionnaire contents consisted of a total of 42 items, including the everyday eating habits of infants and the state of childcare. In addition, occlusal force measurement was performed using an occlusal force meter for infants aged 2–6 years (each about 100 persons) who attended a nursery school in the same city. The proportions of infants who

had not chewed were similar (about 30%) for each year. Therefore, covariance structure analysis was performed using extracted factors. **Results:** The results showed that families who had devised measures for infants to eat meals with enjoyment had more food-related communication, received more enjoyment from eating, had more balanced diets, and concentrated more on their diets. Conversely, infants who had a more unbalanced diet and less concentration on their diet had poor masticatory ability and lower occlusal force. Families who did not have cook with infants at home were increased from one-fourth to half of the total (p < 0.01). No secular change in the occlusal force measurement was observed.

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Analysis of Evidence-Based Local Policy Platforms on Food and Nutrition Security: Case Study in East Lombok District, West Nusa Tenggara, Indonesia

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Keywords: Food security · Evidence-based · RADPG · FSVA (Food Security and Vulnerability Atlas)
Background/Aims: The global governance of food security and nutrition is rapidly entering into a transformative era since the enactment of the 2015–2030 SDGs Agenda towards a world without hunger and nutrition. However, the goals and targets of the SDGs, especially related to food and nutrition security issues, are needed to be interpreted and integrated into the national and regional development agenda. **Methods:** This study aims to analyze local dynamics in the design of local policy platforms on food and nutrition security through a case study of the development of 2018–2023 Regional Food and Nutrition Action Plan (RADPG) in East Lombok District, West Nusa Tenggara Province. Descriptive analysis is conducted based on the results of document reviews, in-depth interviews with key informants, and observations and documentation during researchers' involvement in the RADPG development process. **Results:** The results show that the RADPG as a platform for local food and nutrition security is designed based on an analysis of the 'existing conditions' in terms of food availability, access, and utilization. Evidence in the form of food security and vulnerability mapping at the sub-districts is used.

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Correlation of Fat and Calcium Intake to Overweight and Obesity Based on Body Fat

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Keywords: Fat · Calcium · Overweight · Obesity
Background/Aims: The percentage of body fat was one of indicator to define overweight and obesity. The purpose of this study was to analyze the most correlated risk factors to the prevalence of overweight and obesity based on percent body fat among students in faculty of health sciences, UPNVJ. The risk factors analyzed were characteristics of respondents, included sex, fat and calcium intake. **Methods:** The method of this study was cross sectional design and the number of respondent obtained were 106 students from several departments. Data were analyzed using chi square analysis. **Results:** This research showed that the prevalence of overweight and obesity was 31.1% of students. The statistic analysis showed positive correlation to overweight and obesity (sex, p = 0.008; fat intake, p = 0.031; calcium intake, p = 0.006). Correlated risk factors were analyzed with Multivariate analysis , and the result showed that calcium intake had the most impact to overweight and obesity (p = 0.066; OR = 4.5). **Conclusions:** the less calcium intake, the more risk to overweight and obesity.

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Interactions of Parasit Infection, Nutritional Disorder (Anaemia) and Ferritin Levels in Elementary Shool Children in North Sulawesi

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Keywords: Infections · Anaemia · Children · North Sulawesi
Background/Aims: The Neglected Tropical Diseases (NTDs) are included in the UN millennium goals which is the target of diseases that must be combated. These diseases include soil-transmitted helminth infections including ascariasis, hookworm infection, trichuriasis which is a picture of a disease commonly found in people with low (poor) social-economy. Parasitic infections when coupled with a condition of low nutrition due to low socio-economic conditions, it can cause new problems because children become more at risk of infection due to the risk of anemia and impaired immunity. This study aims to obtain the epidemiology of the spread of parasitic diseases (worm infections) in the North Sulawesi region and their effects on the immune system, diseases caused by parasitic infection interactions with nutritional disorders (malnourished and anemia-ferritin). **Methods:** This study is an analytic observational study with a cross-sectional approach. The study population was all elementary school students in North Sulawesi where samples were taken from several schools in several regency. Samples were taken by purposive sampling method with a total of 100 samples. Data were collected using a questionnaire, examination of feces and blood from the sample. **Results:** A total of 44 samples experienced anemia with 21 samples including worm infections, 64 samples had poor sanitation conditions. **Conclusions:** Based on the results of the study it was concluded that there was a relationship between parasitic worm infection and the incidence of anemia (p = 0.000) and ferritin levels (p = 0.000) in elementary school children in North Sulawesi.

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Intergenerational Transmission of Obesity: Factors Associated with Overweight Mother-Child Pairs from The Malaysian National Health and Morbidity Surveys 2006–2015

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Keywords: Intergenerational · Obesity · Mother-child · Associated factors

Background/Aims: Intergenerational obesity transmission of mother-child pairs is a worrying trend. Other than genetic factors, the socioecological model suggests that family and community factors can influence maternal and child obesity. **Methods:** The purpose of this study is to identify the factors associated with overweight mother/overweight child pairs (OWM/OWC) in Malaysia, by utilizing the data from the National Health and Morbidity Survey, a population-based cross-sectional study for years 2006, 2011 and 2015. In each family, a mother and a child aged between 5 to 17 years were identified. Data of overweight and obese mothers were matched with their overweight and obese offspring respectively in order to match OWM/OWC pairs. Multiple logistic regressions analysis was performed to determine the factors associated with OWM/OWC. **Results:** In years 2006 and 2015, OWM/OWC pairs were associated with mothers with primary education level (aOR = 2.20; 95% CI = 1.47, 3.32 and aOR 2.03; 95% CI = 1.33, 3.08, respectively) and household size of three persons and less (OR = 1.37; 95% CI = 1.01, 1.85 and OR = 2.25; 95% CI = 1.47, 3.44, respectively) while for year 2011, household size of three persons and less was associated with OWM/OWC (OR = 1.60; 95% CI = 1.01, 2.56). Being of Chinese ethnicity was protective factor for OWM/OWC for all years. Households from the two lowest household income quintiles, quintile 1 (OR = 0.46; 95% CI = 0.32, 0.65) and quintile 2 (OR = 0.55; 95% CI = 0.36, 0.83) were protective risk of OWM/OWC for years 2006 and 2015, respectively. **Conclusions:** Maternal education level, household size, ethnicity and household income were associated with both overweight mother and child in Malaysia.

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Traditional Knowledge and Food Taboo among Indigenous Peoples in South Sulawesi, Indonesia

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Keywords: Indigenous people · Food taboo · Qualitative study

Background/Aims: Food system among indigenous peoples is related to their culture and beliefs that influence their daily life, not only physical health but also the emotional, mental as well as spiritual aspects. Beliefs and value system among indigenous peoples are linked to their way of life. Food taboo is unwritten social rules mainly based on religious or due to historical reasons that regulate and affect food consumption in a community. **Methods:** A qualitative study was performed to gather information from mothers among two indigenous peoples in South Sulawesi, Indonesia. The transcripts were analyzed by three steps i.e. coding, categorizing and themes that presented as description and quotation of opinions and experiences. **Results:** Kajang and Kaluppini people believed some food taboos for pregnant and lactating mothers (such as banana flower, pineapple, king fruit, raw papaya, water spinach, and egg). **Conclusions:** This traditional belief in food taboo were practiced by indigenous mothers could hinder them from various nutritious food.

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Characteristics of Healthy Meal Plan for Public University in Peninsular Malaysia to Overcome Food Insecurity

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Keywords: Food insecurity · Meal plan · Meal expenditure · University students

Background/Aims: The prevalence of food insecurity among university students worldwide is growing. This cross-sectional study aimed to assess the prevalence of food insecurity and determine the characteristics of healthy meal plan to overcome food insecurity among public university students in Peninsular Malaysia. **Methods:** About 427 undergraduate students at four randomly selected universities completed a self-administered questionnaire. The questionnaire includes socioeconomic and demographic status, food security status and expenditure for each meal spend by university students. Food insecurity was assessed using USDA 10-item module. Frequency, Mann-Whitney U test, Kruskal Wallis H test and post-hoc test were used to analyse the variables. **Results:** About 60.8% of students was food insecure. There was significant mean different of expenditure for meal; between sex for breakfast, lunch, dinner and total daily spending (p < 0.05), physical activity level for total daily spending among female respondents (p < 0.05), physical activity level for total daily spending among all respondents (p < 0.001) and location of university among female respondents for lunch between UMP and UUM with UKM (p < 0.001), dinner between UUM and UTM (p < 0.05), among all respondents for lunch between UUM and UMP with UKM (p < 0.001), dinner and total daily spending between UUM and UTM (p < 0.05). **Conclusions:** Six healthy meal plan will be developed based on characteristics such as sex, physical activity level and location of university that meet daily nutrient requirement according to Recommended Nutrient Intakes for university students within their daily meal expenditure.

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Association of Diet Quality, Adequacy Level of Macro Nutrient, Level of Preverence and Acceptability to Nutritional Status of Female Student in Daarul Ahsan Islamic Boarding School

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Keywords: Diet quality · Adequacy level · Menu variation

Background/Aims: The study aimed to analyze the relationship between diet quality, level of adequacy of macro nutrients, level of preference for menu variation, and acceptability of food on the nutritional status of female students at Daarul Ahsan Islamic Boarding School. **Methods:** Observational cross-sectional study design with a sample of 95 respondents using proportional stratified random sampling. Bivariate analysis using the chi-square test. **Results:** 62.1% of diet quality was poor category, energy adequacy level was 76.8% in the poor category, protein sufficiency 94.7% in the poor category, 83.2% of fat adequacy in the poor category, 85.3% in carbohydrate adequacy in the category of lack, level of preference 76.8% menu variation in the category does not vary, receiving power is 75.8% in the small category. **Conclusions:** There is a correlation between the level of adequacy of macro nutrients, the level of preference for menu variation, and the acceptability of food on nutritional status. Need to hold a balanced nutrition counseling and planning to reduce the boredom of female student.

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Dietary Diversity and Nutritional Status of Children in Food Insecure Area

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Keywords: Dietary · Wasting · Stunting · Underweight

Background/Aims: Madura Island has become a food insecure area with high prevalence of malnutrition. A diverse diet reflect a good nutrient adequacy. Children in food insecure area are vulnerable to malnutrition. Therefore the aim of this study was to analyse the association of dietary diversity and nutritional status of children in food insecure area. **Methods:** This cross sectional study included 200 children under five and conducted in Madura Island, Indonesia. Antropometric measurements (weight and height) were taken from all children. dietary diversity score (DDS) was measured by food recall 24 hour. Association between dietary diversity and nutritional status was analyse by Spearman rank correlation. **Results:** The prevalence of underweight was 27.5%, stunting 49.0%, and wasting 11%. Most of the children (82.3%) have a good dietary diversity (≥4 food groups). Median and IQR of DDS (4 ± 2), Weight for Age Z-score (−1.55 ± 1.20), Weight for Height Z-score (−0.64 ± 1.28), and Height for Age Z-score (−1.99 ± 1.62). Children dietary diversity score have a positive association with wasting (p = 0.013, r 0.175) but not with underweight (p = 0.229) and stunting (p = 0.425). **Conclusions:** High prevalence of malnutrition was still found in food insecure area. Increasing dietary diversity of children under five can be an approach to reduce the burden of wasting in food insecure area.

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The Association of Fruits and Vegetables with The Risk of Major Depression and Suicide – A Global Comparative Study

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Keywords: Fruits and vegetables · Major depression · Suicide · global statistics

Background/Aims: The association between diet and depression has drawn attention in recent years. Among the dietary factors, fruits and vegetables, which are rich in antioxidants and anti-inflammatory components, were hypothesized to play an important role in depression development. The aim of this research is to clarify the longitudinal association of fruits and vegetables with depression and suicide rate using worldwide statistics. **Methods:** Average food supply (g/day/capita) and energy supply (kcal/day/capita) by country, excluding loss between production and household, were obtained from the Food and Agriculture Organization of the United Nations Statistics Division database (FAOSTAT). Each food was sorted, and supplies of fruits and vegetables were obtained. Data of suicide and major depression by country were derived from the Global Burden of Disease (GBD) 2017 database. The 20-year longitudinal associations of fruits and vegetables with suicide and depression were examined in the 136 countries with populations of 1 million or greater controlling for covariates by the mixed effect model. **Results:** The prevalence of major depression was significantly negatively associated with fruits (β = −0.128 ± 0.036, p < 0.001) and vegetables (β = −0.067 ± 0.028, p = 0.018). As for the rate of suicide, the association with vegetables was significantly negative (β = −0.003 ± 0.001, p < 0.001), but the association with fruits was not significant. **Conclusions:** Vegetable supply was significantly negatively associated the rate of major depression and suicide, and fruits supply was also significantly negatively associated with the rate of suicide after controlling for socioeconomic indicators.

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Assessment of Nutritional Status and Prevalence of Hypertension among District Judiciary Personnel at Lahore Pakistan

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Keywords: Nutritional status · BMI · Hypertension · Judiciary personnel

Background/Aims: Optimal nutritional status and a balanced diet are essential for operational readiness and optimal health of judicial personnel. Few studies have assessed nutritionalstatus in this population. The objectives of this study are to assess the level of nutritional status of judicial officers and officials in terms of BMI, and their relationship with the prevalence of hypertension. **Methods:** One hundred and five 105 subjects were randomly selected the judicial officers and officials working in the district judiciary Lahore. A descriptive method was used for this observational study. Anthropometrics measurements determined the Body Mass Index according to WHO to identify the level of nutritional status. Data was entered and analysed for descriptive statistics using the Statistical Package for the Social Sciences (SPSS) version 23.0. **Results:** Out of 105 subjects, 71.4% were male and 28.6% were female and mean age of the subjects was 34.83 ± 7.35. The majority of the group between age 31–40 years was 44.8% and with normal nutritional status 71.4%. Out of 105 subjects, 36.2% were hypertensive and 63.8% were non-hypertensive. **Conclusions:** It was concluded that hypertension and nutritional status in terms of BMI are not associated with each other.

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Is Waist Circumference Correlated with Hypertension among Women in Rural Area?

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Keywords: Hypertension · Waist circumference · Women

Background/Aims: Obesity is a risk factor for non-communicable diseases, including hypertension. Hypertension has become a silent killer which prevalence keep rising year by year in Indonesia. Therefore this study aimed for analyzing the correlation between obesity, which is marked by waist circumference as abdominal obesity, and hypertension among women in rural area. **Methods:** This was a cross sectional study. A total of 112 women participated in the study. All measurements were done twice using calibrated tools. Waist circumference was measured by measuring tape and blood pressure was measured using an automatic blood pressure monitor (OMRON Automatic Blood Pressure Monitor Model HEM-7200). Data was analyzed using Pearson correlation test. **Results:** 66.1% women had waist circumference >80 cm which is considered as abdominal obesity. As much as 51.8% women

were hypertension (systolic blood pressure ≥130 mm Hg or diastolic blood pressure ≥85 mm Hg). **Conclusions:** Waist circumference was correlated with hypertension (p = 0.005). High prevalence of hypertension and abdominal obesity were found in this study. Women in rural area needs more attention on their body fat composition in order to decrease the risk of hypertension. A health education program also recommended due to high prevalence of abdominal obesity and hypertension in women in rural area.

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Food Waste and Loss in Romania. Causes, Impacts and Proposals

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Keywords: Food, Waste, Loss, Analysis, Romania

Background/Aims: World food waste and losses amount to about 1.3 billion tonnes of food annually. Loss and waste of food is an important issue in Romania. About 5 million tonnes of food waste is produced annually, while about 25% of the population lives in poverty and has difficulty in purchasing daily food. The paper proposes an analysis of the causes of food waste in Romania and the measures to reduce it. **Results:** The study showed that the biggest food losses are recorded in urban areas. While rural communities use traditional household waste collection methods, more than 95% of urban debris reaches the landfill, making it impossible to recycle. Beyond the social and moral aspects, waste generates major negative environmental effects: water losses and losses, soil and energy resources, habitats and biodiversity, greenhouse gas emissions and contributing to climate change, fertilizer pollution, pesticides and methane resulting from the decomposition of food waste. Romanian officials have adopted a series of measures in recent years and will try to reduce food waste by 50% by 2030. Research is useful to the business environment and the individual consumer, highlighting the measures needed to reduce losses in the agri-food chain.

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Food Trade Does Not Exist, Contributing to Malnutrition in Asmat Ethnicity

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Keywords: Food access · Malnutrition · Asmat

Background/Aims: The Citak Sub Ethnic Asmat ethnic group is one of the ethnic groups who still choose to live semi nomadically. Based on the above notes, this study aims to describe the way food is provided and the nutritional status of Asmat ethnic children in Papua Province. **Methods:** This study is a cross-sectional study, the sample size of 197 people, purposively in 12 Kolofbrasa Papua District villages. **Results:** The results of the study revealed that the majority of the population of ethnic Citak Asmat sub-ethnic groups

were 43.19% and had no permanent employment as much as 35.68%. Farmers in the Kolofbrasa district are farmers moving to move without permanent land. Food supply is daily (sago) for consumption of two to three days. There are no sago trade transactions although these foods are stapled foods, as are other foods. Especially for rice is only obtained through poor rice assistance by the government every three months. The absence of a market as a center for trade in food commodities. Food supply influenced by program social safety net (rice low cost) by government Indonesia. The nutritional status of children were wasting, stunting and underweight respectively 17.3%, 40% and 26.8%. **Conclusions:** The absence of food trade and market in Kolofbrasa sub district Asmat Papua and also semi nomadic population were at risk of malnutrition for child.

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Sarcopenia in Relation to Nutrition and Lifestyle Factors among Obese Adults Aged Over 40 Years in South Korea

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Keywords: Sarcopenic obesity · Dietary quality · Nutrition · Lifestyle factors · South Korean
Background/Aims: The combination of obesity and sarcopenia causes a greater risk of chronic diseases and disability to the elderly than either obesity or sarcopenia alone. We assessed the prevalence of sarcopenia and examined the association between nutrition, lifestyle factors and sarcopenia in Korean obese adults aged over 40 years who are standing on the point of muscle loss. **Methods:** Data from the 2008–2011 Korea National Health and Nutrition Examination Survey for 3,937 adults with obesity aged over 40 years were used. The subjects were classified as sarcopenic obesity (SO) and non-sarcopenic obesity (NSO). We examined the association between lifestyle factors such as dietary factors [dietary quality: Mean Adequacy Ratio (MAR), Nutrition Adequacy Ratio (NAR), protein, vegetables/fruits intakes], physical activities and psychological health. **Results:** As a results, 52.5% of participants were SO. SO was associated with lower MAR [OR = 0.412 (0.221, 0.765)], lower NAR of antioxidant nutrients (vitamin A, B1, B2, C), phosphorus and energy [OR = 0.452 (0.252, 0.812)], less aerobic [OR = 1.272 (1.022, 1.582)] and flexibility exercise [OR = 0.904 (0.857, 0.953)] and worse psychological health such as perceived stress [OR = 1.280 (1.019, 1.609)], depressive symptom [OR = 1.500 (1.119, 2.009)] , suicidal ideation [OR = 1.679 (1.234, 2.284)] among Korean adults with obesity. **Conclusions:** Over half of middle-aged and elder Korean adults with obesity had sarcopenia. Lower dietary quality, vegetables/fruits intakes, physical activities and negative mental health were associated with sarcopenia among Korean adults with obesity.

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Determinants of Anemia among Female Factory Workers in Hlaing Thar Yar Township, Yangon

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Keywords: Anemia · Determinants · Women · Haemoglobin
Background/Aims: A community based cross sectional descriptive study was carried out from November 2017 to February 2018 in Hlaing Thar Yar Township to study determinants of anemia among female factory workers who are working at garment factories. The objectives were to find out the proportion of anemia by using Mission plus hemoglobin testing system, to describe the determinants of anemia among female factory workers and to find out the relationship between determinants of anemia with prevalence in population. **Methods:** In this study, 226 reproductive age women were included. The determinants of anemia (socioeconomic status, nutritional status, clinical history, dietary habit and knowledge) were collected in pre-tested questionnaires. Hemoglobin levels were examined by Mission plus hemoglobin testing system. Height, weight, waist and hip circumference were also measured to assess the nutritional status. All questionnaires were edited manually and data entered in a computer and analyzed using SPSS statistical package. **Results:** The prevalence of anemia was 55.8% (severe public health problem according to WHO cutoff). Eating habit of iron absorption inhibitors during and after meal was significantly associated with anemia (p < 0.05). Other determinants of anemia were not significantly associated with anemia. **Conclusions:** This study has confirmed that anemia is a severe public health problem among women at reproductive age. The cause of anemia were multiple and complex. A behavioral communication change campaign is needed to promote healthy eating pattern and eating habit. Moreover, health and nutrition sectors should be coordinated with other local authorities to develop food availability and food sharing accessibility.

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Management Strategy for Household Food Security in Jambi Province

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Keywords: Aggressive food security · Household · Strategy · SWOT
Background/Aims: This research was aimed to: (1) analyze household food security, and (2) formulate a strategy managing household food security in Jambi Province, Indonesia. **Methods:** The study design was a cross sectional and was conducted in four selected districts in Jambi Province namely: Kerinci, Merangin, Muaro Jambi, and Tanjung Jabung Barat Districts. This research was done in six calendar months. The object of this research was farm households with research variables: (1) household food security, and (2) strategies for managing household food security based

on internal factors (aspects of strengths and weaknesses), and external factors (aspects of opportunities and threats). Data was collected by using observation, direct interviews, in-depth interviews, Focus Group Discussion (FGD), and documentation methods. The number of respondents was 100 households at each district which was chosen taken by cluster stratified simple random sampling in each sample district, the total sample was 400 households. Data were analyzed by using SWOT approach. **Results:** The results of the analysis show that the population in Jambi Province is in the food secured level. **Conclusions:** Based on the SWOT analysis results it is concluded that Jambi Province household food security could be developed in an aggressive strategy.

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Poverty Alleviation Model in Communities Peatland Areas of Jambi Province

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Keywords: Family income · Household resources · Peatland areas · Poverty · Social capital

Background/Aims: This research is aimed to analyze the poverty alleviation model in communities peatland areas of Jambi Province. **Methods:** The research was design using with a cross-sectional. The research was conducted in peatland areas of Jambi Province by selecting two districts, namely: district of Tanjung Jabung Barat and Tanjung Jabung Timur. The research was conducted from July to December 2018. Data were collected by using structured questionnaires covered family characteristic, family income, social capital and household resources management. The sample was 180 families and were taken by simple random sampling. Data were tested by descriptive and SEM approach with the Linear Structural Relationship (LISREL) program. **Results:** This research showed the income level of communities in peatland areas of Jambi Province were Rp. 4,781,000,000, – or income sufficiently. **Conclusions:** The analysis showed poverty alleviation model in communities peatland areas is through the use of social capital and management of household resources.

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Risk Factors of Prediabetes among Sago Consumption Communities in Kepulauan Meranti District, Riau Province: A Community Based a Cross Sectional Study

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Keywords: Sago · Prediabetes · Random blood glucose

Background/Aims: Prediabetes can be prevented from becoming type 2 diabetes (T2DM) by managing risk factors. The objective of this study was to identify the risk factors of prediabetes in sago consumption communities in Kepulauan Meranti District, Riau Province. **Methods:** The cross-sectional community-based nutrition survey was conducted by involving 181 subjects selected purposively. Socio-demographic characteristics, anthropometry, lifestyle, history of T2DM, random blood glucose, cholesterol levels, systolic blood pressure, diastolic blood pressure, and waist circumference were collected. **Results:** 72.93% of the subject who consumed sago ≥50 grams/day and 18.23% who consumed sago<50 grams/ day had normal blood glucose levels. Both of subjects had no relationship between socio-demographic factors, lifestyle, history of T2DM, cholesterol level, waist circumference, and prediabetes incidence. However, systolic blood pressure significantly associated with prediabetes incidence. **Conclusions:** Consuming sago ≥50 grams/day could prevent prediabetes from developing to T2DM and systolic blood pressure has a significant role in controlling blood glucose level.

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Fe, Se and Zn Content in Spinach from Java Island

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Keywords: Spinach · Fe · Se · Zn · Java Island · NAA

Background/Aims: Spinach is one of leafy vegetables that widely consumed in Indonesia. According to National Survey of Social and Economics by Centre of Statistical Bureau (BPS) in 2016, about 97.29% of Indonesian people consuming vegetables, with spinach ranks first. Spinach is a low-cost food and potentially a good source of vitamins and mineral essentials such as Fe, Se and Zn that plays an important role in human metabolism. Therefore, the level of the micronutrients in spinach needs to be determined. **Methods:** In this study, spinach that obtained from several traditional markets in Java Island was analyzed using specific and sensitive analytical technique Neutron Activation Analysis (NAA). Spinach samples were irradiated at the rabbit system in the reactor G.A Siwabessy facilities with neutron flux ~ 1013 n.cm-2.s-1 and then counted using HPGe detector. **Results:** The concentration of Fe, Se, and Zn were in the range of 6.87–397.29; 0.002–2.146 and 0.11–32.31 mg/kg respectively. **Conclusions:** This results can be utilized to determine the dietary intake particularly Fe, Se and Zn from spinach.

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Improvement of Nutrition Status and Enhancement of Community Resilience by Ensuring Sustainable Food Security

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Keywords: Sustainable food security · Climate change · Community resilience · Stable nutritious status

Background/Aims: It is well known that food security has to be ensured to improve the nutrition status. Despite that Vietnam ranks as one of the largest rice exporters in the world, ethnic minority people in the mountainous areas of Central Vietnam still suffer from food shortage for three to four months per year and experience high malnutrition rate. Besides, Vietnam is the country of natural disaster risk which causes serious problems on agricultural productivity. **Results:** In 2012, the Foundation for International Development/Relief (FIDR), a Japan-based NGO launched a project to increase the rice productivity, the staple food in Vietnam, for sustainable food security, response to climate change and a concept of resilience in agriculture. As a result, recent study shows that methods introduced are effective to increase yields by 1.5 times more in average and the number of months in food shortage was reduced from 4.8 to 2.5. The dissemination model which FIDR created with Vietnamese government is people-centered approach, leading the social cohesion to tackle the problems and enhancing the community resilience. This movement also brought the positive impact to the peoples' life that they started to diversify their diet for the stable nutritious status for the family, especially for the children, as they now have enough food to feed and are able to obtain alternatives. **Conclusion:** Food is vital for our life and it is essential to ensure food security before considering the improvement of nutrition status.

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Traditional Japanese Diet Score, Major Depression, and Suicide Rate by a 20-Years Global Comparative Study

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Keywords: Traditional Japanese dietary score · Major depression · Suicide · Global statistics

Background/Aims: Depression and suicide are major problems in the world. It is reported that mental health is related to dietary habit, but it is not clear enough yet. The purpose of this study is to clarify the longitudinal association of Traditional Japanese Diet Score (TJDS) with major depression and suicide rate in the world using international statistics. **Methods:** Food (g/day/capita) and energy supply (kcal/day/capita) by countries, excluding loss between production and household, were identified by the Food and Agriculture Organization of the United Nations Statistics Division database. The sum of characterizing traditional Japanese foods supply (beneficial food components in Japanese diet; rice, fish, soybeans, vegetables, eggs, seaweeds, food components not use so much in Japanese diet; wheat, milk, and red meat) were divided as tertile (beneficial food components;-1, 0, 1, not use so much food components; 1, 0, −1). Suicide and major depression by country were derived from the Global Burden of Disease 2017 database. The 20 years longitudinal associations between TJDS, suicide and depression were examined in the 138 countries with populations of 1 million or greater by mixed effect model. **Results:** The prevalence of major depression was significantly negatively associated with TJDS controlled for socioeconomic and lifestyle covariates ($\beta = -7.0 \pm 2.1$, $p < 0.001$). As so the association of TJDS with the rate of suicide, it was also significant negative after controlled for covariates ($\beta = -0.20 \pm 0.05$, $p < 0.001$). **Conclusions:** TJDS may lead to the prevention of major depression and suicide.

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Preliminary Findings on The Prevalence of Metabolic Syndrome and Association with Socio-Demographic and Lifestyle Factors in Malaysian Punjabi Adults

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Keywords: Metabolic syndrome · Socio-demographic factors · Lifestyle factors · Malaysian Punjabi

Background/Aims: Globally, Punjabi population has higher risk of metabolic syndrome (MetS). This study aimed to determine the prevalence and the association between socio-demographic and lifestyle factors with MetS in Malaysian Punjabi adults. Body mass index (BMI), waist circumference (WC), systolic (SBP) and diastolic (DBP) blood pressure, blood glucose (BG), triglycerides (TG), total cholesterol (TC), low-density (LDL-C) and high-density (HDL-C) lipoprotein cholesterol were obtained. A total of 69 (29% males;71% females) subjects were included. **Results:** The prevalence of MetS was 38% (69% females;31% males). Central obesity (87%) was the most prevalent MetS component followed by raised blood pressure (65%), BG (28%), TG (26%) and low HDL-C (14%) level. Mean BMI indicated overweight status, 25.3 kg/m^2 (4.08 SD). High WC was observed in males, 98.0 cm (10.23 SD) and females, 89.7 cm (11.37 SD). High LDL-C (87%) and TC (67%) were the most found biomarkers: with mean values 3.7 mmol/L (1.00 SD) and 5.7 mmol/L (1.10 SD) respectively. Mean values for BG: 5.3 mmol/L (1.21 SD), TG: 1.4 mmol/L (0.63 SD), and HDL-C: 1.4 mmol/L (0.38 SD) were in normal range. Age had no significant association with MetS, but significantly correlated with SBP ($r = 0.460$, $p < 0.001$) and BG ($r = 0.261$, $p = 0.030$). No significant association was found between MetS and lifestyle factors: alcohol drinking and exercise. Mean values for central obesity and TG were significantly higher in alcohol drinkers than non-drinkers ($p = 0.010–0.037$). Subjects who exercise had significant lower mean value of TG than without exercise ($p = 0.040$). **Conclusion:** Malaysian Punjabi adults especially females have high prevalence of MetS. Age, alcohol drinking and sedentary lifestyle had no significant association with MetS but were significantly associated with MetS components.

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Association Between Fruits Consumption and Osteosarcopenic Obesity in Korean Male Adults: Korea National Health and Nutrition Examination Survey 2008–2010

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Keywords: Osteosarcopenic obesity · Fruits · Korean · Male adults

Background/Aims: Osteosarcopenic obesity is a term to describe a concurrent apperance of the osteopenia/osteoporosis, sarcopenia, and obesity. Osteosarcopenic obesity may lead to some chronic conditions, like cancer, diabetes, and other worse metabolic outcomes. We investigated the association between dietary factors, especially fruit, and osteosarcopenic obesity in Korean male adults. **Methods:** We analyzed the 2008~2010 Korea National Health and Nutrition Examination Survey consisting of 3,099 men aged 50 years or older. Body composition was evaluated by dual-energy X-ray absorptiometry (DXA). Dietary factors was analyzed using the 24-hour dietary recall method and 63-items food frequency questionnaire. **Results:** The number of subjects with body composition abnormalities was: 941 (34.7%) with none, 1,213 (39.2%) with one, 888 (24.6%) with two, and 57 (1.5%) with all three abnormalities (OSO). Subjects with a higher number of body composition abnormalities tended to be significantly older. Education levels, income levels and alcohol consumption frequency were also significantly associated to adverse body composition. Subjects with a higher number of body composition abnormalities tended to have a lower energy and food intakes.Subjects with a lower number of body composition abnormalities significantly tended to consume fruits frequently (None: 7.1 times/w, One: 6.8 times/w, Two: 5.9 times/w, Three: 6.3 times/w). **Conclusion:** The results indicate that fruits consumption was associated with osteosarcopenic obesity in Korean men. [This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIP; Ministry of Science, ICT & Future Planning) (No. 2017R1C1B5017636)].

Track 6: Biochemistry, Physiology, Nutrition and Immunity

Oral Presentation

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Folate Status at Diagnosis Is Associated with Hepatocellular Carcinoma Survival in the Guangdong Liver Cancer Cohort Study

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Keywords: Folate status · Hepatocellular carcinoma · Survival · Prospective study

Background: Existing data on folate status and hepatocellular carcinoma (HCC) prognosis are scarce. We examined whether serum folate concentrations at the time of HCC diagnosis were associated with liver cancer-specific survival (LCSS) and overall survival (OS). **Methods:** We included 982 patients with newly diagnosed, previously untreated HCC enrolled in the Guangdong Liver Cancer Cohort (GLCC) study between September 2013 and February 2017. Serum folate concentrations were measured using chemiluminescent microparticle immunoassay. Cox proportional hazards models were performed to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) by sex-specific quartile of serum folate. **Results:** Serum folate concentrations were inversely associated with both LCSS and OS. Compared with patients in the third quartile of serum folate, those in the lowest quartile had inferior LCSS (HR = 1.49, 95% CI: 1.06–2.08) and OS (HR = 1.44, 95% CI: 1.04–1.99) after adjustment for nonclinical and clinical prognostic factors. This finding was not significantly modified by sex, age at diagnosis, preexisting liver damage and BCLC stage (all $P > 0.05$ for interaction). However, serum folate concentrations were inversely associated with LCSS and OS only among patients who had CRP > 3.0 mg/L (Q1 vs. Q3: HR = 1.62, 95% CI, 1.08–2.43 for LCSS; and HR = 1.49, 95% CI, 1.01–2.19 for OS), but not among those with CRP ≤ 3.0 mg/L (all $P = 0.01$ for interaction). **Conclusion:** The findings suggest that low folate status at diagnosis is independently associated with worse HCC survival, especially among patients with systemic inflammation. A future trial of folate supplementation seems to be promising in HCC patients with low folate status.

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Black Rice Bran Inhibit Colorectal Cancer Development by Inhibition Proliferation and Enhancement Apoptotic on BALB/c Mice

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Keywords: BALB/c · Black rice bran · Colorectal cancer

Background: Colorectal cancer is a disease that occurs in the surface of large intestine. The objective of this study was to evaluate the effect of black rice bran (BRB) to observe colorectal cancer development on BALB/c mice. **Methods:** Male BALB/c mice (n = 24) were divided into three groups, there were normal group (K-), colon cancer induced group (K+), and colon cancer induced group which was fed by modified feed that replaced fiber with BRB. The K- and K+ group was fed by AIN (American Institut of Nutrition)-93M standar diet that use cellulose powder as fiber source and for BRB group, the fiber source was replaced with BRB. Azoxymethane and dextran sodium sulphate were used as a carginogen. This study using RT-PCR and Immunohistochemistry method. **Results:** Histopathological description of colon tissue showed that tumor growth rate could be inhibited by the addition of BRB compared to K +. The decrease the PCNA expression from and the increase of caspase 3 and caspase 8 expression were observed compared to K+ group as the result of BRB addition. The administration of black rice bran in the BRB group significantly decreased the expression of pcna compared with control mice (K+) (0.58 ± 0.09-fold change vs 5.22 ± 0.80-fold change). Expression gene levels of caspase 3 (0.91 ± 0.20-fold change) and caspase 8 (0.36 ± 0.15-fold change) in the BRB group were significantly higher compared to K+. **Conclusion:** The result showed that the addition of BRB could inhibit colon carcinogenesis.

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Dietary Function of Adenosine as Anti Metabolic Syndrome-Related Diseases in Stroke-Prone Spontaneously Hypertensive Rats

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Keywords: Adenosine · Glucose metabolism · Hypertension · Lipid metabolism

Background: Adenosine (ADN) is an endogenous purine nucleoside that modulates many physiological processes. The func-

tional properties of ADN on the regulation of metabolic-related diseases have been studied such as decreased blood glucose and insulin concentration, beneficial effects on neonatal refractory pulmonary hypertension, and attenuating the proliferation of both human and rat glomerular mesangial cells associated with hypertension and diabetes. The purpose of the present study was to investigate the effect of ADN administration on metabolic syndrome-related parameters in SHRSP fed a high fat diet. **Methods:** We used stroke-prone spontaneously hypertensive rats (SHRSP) as a suitable animal model of hypertension-related disorders that are similar to human essential hypertension, hyperlipidemia and insulin resistance. Six-week-old rats of SHRSP were divided into three groups and administered either water (control) or ADN (10 mg/l or 100 mg/l) for 8 weeks. During this period, the rats had free access to a high fat diet based on AIN-93M. **Results:** Data obtained from this study showed hypertension, plasma lipid, nitric oxide, insulin, and glucose levels were improved significantly in both ADN groups (p < 0.05). The mRNA expression levels of genes involved in anti-oxidative activity and adenosine receptors were also altered in the ADN groups (p < 0.05). Administration of ADN also increased plasma adiponectin levels, accompanied by upregulation of mRNA expression level of adiponectin and adiponectin receptor 1 in perirenal fat and adiponectin receptor 2 in the liver (p < 0.05). **Conclusion:** administration of ADN is effective for improving metabolic syndrome-related parameters in SHRSP.

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Association between Vitamin D-Related Gene Polymorphisms and Serum 25-Hydroxyvitamin D Levels: A Prospective Cohort Study in West Sumatra, Indonesia

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Keywords: Vitamin D · Single-nucleotide polymorphism · 25-hydroxyvitamin D · Pregnancy · Vitamin D Pathway · West Sumatra

Background: Several candidate genes in vitamin D synthesis and metabolism have reported a significant association with 25-hydroxyvitamin D (25(OH)D) in Caucasians and African Americans. Few studies have indicated this relationship among Asian, especially in West Sumatran pregnant women, Indonesia. **Methods:** The study was conducted among 186 singleton pregnant mothers of West Sumatran Vitamin D Pregnant Mother (VDPM) cohort study, were recruited and followed from the first trimester ((T1) to delivery process (~9 months). Serum 25(OH)D obtained during T1 and T3. Genetic risk scores (GRS) were created based on six vitamin D–related SNPs and their association with 25(OH)D levels were tested. Information on demographics, lifestyle, pregnancy profile, dietary intake, and physical activity was collected using a questionnaire. **Results:** Mean serum 25(OH)D levels in T1 and T3 levels were 14.00 ± 6.98 and 21.21 ± 10.41 ng/mL, respectively. Vitamin D-GRS has significantly associated with serum 25(OH)D levels in the third trimester (P = 0.004) and changes 25(OH)D levels during pregnancy (P = 0.018), but not in the first trimester. However, synthesis-GRS and metabolism-GRS group of vitamin D genetic variants pathway had no effect in 25(OH)D levels and changes 25(OH)D levels during pregnancy (P > 0.05). High prevalence of low maternal vitamin D status during pregnancy commonly found in the first trimester. **Conclusion:** We observed an association between vitamin D-GRS and 25(OH)D levels during pregnancy. Our results provide additional support for a possible role of genetic variation in vitamin D-related genes on vitamin D status during pregnancy. Further replication studies utilizing larger sample sizes are needed to confirm our findings.

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The Relationship between Blood Pressure and Sodium Consumption with Dementia in the Elderly

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Keywords: Blood pressure · Sodium consumption · Dementia · Elderly

Background: Cognitive impairment can reduce the quality of life of the elderly, and may affect disability and death. It is estimated that there are 24.3 million cases of dementia, with 4.6 million new cases worldwide every year. Dementia is influenced by various factors, including blood pressure and sodium consumption. High blood pressure can disrupt the circulation of cerebral blood flow which may further cause disruption of function, impaired cognitive function that results in dementia. High consumption of sodium can increase blood pressure, increasing the risk of stroke and dementia. The purpose of this study was to analyze the relationship between blood pressure and sodium consumption with dementia in the elderly. **Methods:** This study was an analytical study with cros sectional design, applied to the elderly aged over 50 years (n = 322) who participated in the elderly Integrated Health Post at Tiudan Health Center. The duration of hypertension was confirmed from the healthy elderly card, blood pressure was measured by using sphygmomanometer, sodium consumption was assessed by food frequency questionnaire and 24 hours of food recall, dementia status was collected through interviews using the minimental state exam (MMSE). The relationship of all variables was processed using the *Chi-square* test. **Results:** The duration of hypertension, high blood pressure, the amount of sodium consumption and sodium consumption derived from salt and seasonings are significantly associated (p < 0.05) with dementia. **Conclusion:** The results showed that blood pressure and sodium consumption correlated with dementia.

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Inhibitory Effects of Oligo-Fucoidan and High Stability Fucoxanthin against Hepatic Lipotoxicity in Vitro and in Vivo

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Keywords: Hepatocyte · Lipotoxicity · Oligo-fucoidan · High stability fucoxathin

Background: Diet-induced non-alcoholic fatty liver disease (NAFLD) is one of metabolic syndrome due to lipotoxicity. Lipotoxicity is induced by saturated fatty acid (SFA), palmitic acid specifically, resulted in hepatocytes inflammation and cell death. Previous studies show that Oligo-fucoidan and high stability fucoxathin derived from nature brown seaweed (OF-HF) which has some adjuvant therapeutic activities such as anti-oxidative and anti-inflammation. In the present study we examined the protective effects of the extract from Oligo-fucoidan and high stability fucoxanthin-containing seaweed on palmitic acid-induced cytotoxicity of human HepaRG hepatocytes. **Methods:** This study used bovine serum albumin conjugated-palmitic acid (PA-BSA), Oligo-fucoidan and high stability fucoxathin-containing extract from Oligo-fucoidan and high stability fucoxanthin-containing seaweed (OF-HF). Cell viability, cell morphology, mitochondrial membrane potential, translocation of phosphatidylserine (PS) cell membrane, fragmented DNA, and caspase-3 activity were evaluated. **Results:** OF-HF had ability to inhibit PA-BSA induced apoptotic hepatocyte cell death by enhancing the cell viability, blocking the depolarization of mitochondrial ΔΨ, blocking PS cellular membrane exposure, reducing the DNA fragmentation, and decreasing activity of caspase-3. We demonstrated that OF-HF reduced PA-induced apoptosis in hepatocytes. **Conclusion:** OF-HF may have protective potential against SFA-induced liver dysfunction. Following we will study the proteomic profiling of PA-treated hepatocytes to discover the novel lipotoxic biomarkers for NAFLD treatment.

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Metabolism of Luteolin Tetramethyl Ether with Rat Liver Microsomes

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Keywords: Tetramethoxyflavone · Metabolism · Rat · Liver

Background: 5,7,3',4'-tetramethoxyflavone (LTM) are found abundantly in the rhizome of black ginger (Kaempferia parviflora) and have been reported to show various phamacological effects such as anti-cancer, anti-inflammatory, anti-gastric ulcer and anti-allergic activities. To elucidate whether the effects are attributable to parent compounds or their metabolites, we examined the metabolism of LTM by rat liver microsomes, and effect of cytochrome P450 (CYP) inducers, phenobarbital (PB), 3-methylcholantrene (MC) and dexamethasone (DEX) on LTM metabolism. **Methods:** Rat liver microsomes were prepared from untreated and each CYP inducer-treated rats. LTM was incubated for 20 min at 37°C with rat liver microsomes, NADPH and HEPES buffer (pH 7.4) under aerobic conditions. The cold methanol was added to the incubation mixture, which were centrifuged to remove the denatured protein. An aliquot of the supernatants was applied to HPLC and LC-MS to measure the metabolites. **Results:** LTM was metabolized to eleven metabolites by rat liver microsomes. They consisted of a mono-hydroxy-LTM (M3), three mono-demethylated LTM (BM3, M2, M5), four di-demethylated LTM (BM1, BM2, M6, M8), two mono-hydroxy-mono-demethylated LTM (M1, M7) and a mono-hydroxy-di-demethylated LTM (M4). M2 was the main metabolite in untreated, PB-treated and DEX-treated rats. PB treatment increased M2, M6 and M8 significantly. MC treatment increased BM3 and BM2 significantly and resulted in three new metabolites, M1, BM1 and M4. DEX treatment increased BM3, BM2 and M8, and also produced M3 and M1. **Conclusion:** These results suggest that LTM metabolism proceeds via demethylation and hydroxylation which are catalyzed by CYP1A and CYP3A enzymes in rat liver.

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High Fructose Diet Initially Promotes Increasing Aortic Wall Thickness and Fatty Liver than Body Fat Index in Sprague Dawley Rats

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Keywords: Atherosclerosis · Body fat index · Dietary fructose · Fatty liver

Background: Dietary fructose has been responsible to induce obesity; however, the effect also promotes atherosclerosis and fatty liver as part of metabolic syndrome. Of the two, the effect which promotes earlier requires further investigation. This study examined the correlation of high fructose diet on early atherosclerosis signed by increasing foam cell and aortic wall thickness; and examined the correlation of high fructose diet on fatty liver cell amount, and body fat index (BFI) as one of obesity markers among 12-week-old Sprague Dawley (SD) rats. **Methods:** For 16 weeks, 36 SD rats were fed with modified diet from AIN 93G containing 30% fructose, and another group had null fructose. Fat contents on the diet of both groups were 25% from total energy. After the rats were sacrificed, the number of foam cell, aortic wall thickness, and fatty liver cell amount were analyzed after Haematoxylin Eosin (HE) staining. The BFI was analyzed by weighing total white adipose tissue divided body weight multiplied by 100. **Results:** The

results revealed that dietary fructose has a significant positive correlation with premature atherosclerosis by increasing foam cell (r = 0.66) and increasing of aortic wall thickness (r = 0.68). Also, 30% dietary fructose has a significant positive correlation on fatty liver (r = 0.69). Interestingly, the 30% fructose intervention for 17 weeks did not induce the increase of body fat index (p > 0.5; r = 0.13). **Conclusion:** This study shows that dietary fructose adverse metabolic syndrome promotes early atherosclerosis and fatty liver without increasing body fat index.

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Alteration in Zinc Transporter mRNA Expression in Zinc Depleted Condition by TPEN {N,N,Na²,Na²-Tetrakis(2-Pyridylmethyl) Ethylenediamine}: A Cell-Line Based Study

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Keywords: Zinc · ZnT1 · MT · TPEN · Nutrigenomics
Background: Zinc deficiency is rapidly emerging as one of the important concerns in public health nutrition. Early diagnosis of zinc deficiency still remains a major challenge. We investigated the expression level of different zinc transporters in zinc deficient condition induced by TPEN, an intracellular zinc chelator in different cell lines like human monocyte (THP-1), skeletal muscle (RD), bone (Saos-2), liver (HepG2), representing different tissues which play key roles in zinc homeostasis. **Methods:** Cells were exposed to TPEN at various concentrations (2,5,10 μM) for 2–12 hours and mRNA levels of ZnT1 and MT were analysed using qPCR. Statistical analysis was carried out using one-way ANOVA. **Results:** ZnT1 expression was significantly different at 4 hours with TPEN concentration 2 μM and 5 μM as compared to untreated controls in THP-1 whereas in HepG2, significant differences were observed at 5 μM and 10 μM TPEN concentration after 6 hours. In RD, significant differences were observed at 4 hours in presence of 2 μM TPEN and in Saos2 expression was significantly different at 2 hours with 2 μM, 5 μM and 10 μM TPEN as compared to respective controls. Expression of MT in THP1 was significantly different at 2 hours and 12 hours control in presence of 2 μM,5 μM and 10 μM TPEN, whereas in HepG2 significant difference was at 2 μM,5 μM and 10 μM TPEN after 6 hours of treatment. In RD MT expression was significantly different at 10 μM for 12 hours.Similarly, in Saos2 expression was significantly different in the presence of 5 μM and 10 μM TPEN. **Conclusion:** This study may help us to understand the molecular cross talks among different zinc tissue storage depots during zinc deficiency and identification of early biomarkers for zinc deficiency.

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Morin Attenuates High Glucose-Induced DNA Damage and Apoptosis through Activation of Amp-Activated Protein Kinase in Schwann Cells

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Keywords: Morin · High glucose · Schwann cells · AMPK
Background: Oxidative stress due to high glucose (HG) acts as an inducer of Schwann cell dysfunction. Although, the neuroprotective effects of morin, a bioflavonoid, have been recognized in previous studies, the cytoprotective effect against HG in Schwann cells is not well known. Therefore, this study was conducted to evaluate the protective effect of morin on HG-induced cytotoxicity using HEI193 cells. **Methods:** Cell viability was assessed using MTT assay. DAPI staining, Annexin V staining, mitochondrial membrane potential, ATP content, ROS and 8-OHdG levels were performed to detect cell damage and apoptosis. **Results:** Morin effectively reduced HG-induced DNA damage and apoptosis, which was related to the blockage of ROS generation. Morin also protected the HG-induced mitochondrial dysfunction. In addition, morin attenuated HG-induced release of cytochrome c into the cytoplasm, increase of the Bax/Bcl-2 ratio, activation of caspase-3 and degradation of PARP. Furthermore, morin restored the inactivation of AMPK in HEI193 cells exposed to HG and the cytoprotective effects of morin on HG were further enhanced in the presence of pharmacologic activator of AMPK. **Conclusion:** These results indicate that morin has a protective effect on HG-mediated cell damage by inhibiting ROS generation and preserving mitochondrial function through activation of AMPK signaling pathway.

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Impact of Weight Loss Program in Metabolic Profiles and Body Fat Improvement Among Indonesian Young Obesity: A Randomized Clinical Trial

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Keywords: Obesity · Triglyceride · High density lipoprotein · Diet · Exercise
Background: Abdominal obesity defined as an accumulation visceral fat in abdomen is linked to metabolic disorders that contribute to chronic diseases. Triglyceride (TG) to high density lipoprotein (TG/HDL) ratio considered as an insulin resistance (IR) marker is an inexpensive test. The waist to height ratio (WHtR) has been advocated as an effective and convenient measurement of central adiposity that could potentially be superior instead of BMI in determining cardio metabolic risk. The objective of this study was to investigate the effect of 8-week-high protein diet plus exercise on TG, HDL, TG/HDL ratio, waist to height ratio (WHtR), waist circumference (WC) and body weight (BW).

Methods: This study was a randomized clinical trial in 43 subjects with BMI >25 kg/m^2. Subjects were randomized in to 3 groups: High Protein Diet Exercise (HPDE; n = 15) High Protein Diet (HPD; n = 15) and Control Group (CG; n = 13). The prescribed diet consisted 1200 calories plus; while the exercise was provided 5 times/ week for 8-weeks. **Results:** The hypocaloric diet comprised 55% carbohydrate, 25% protein, and 20% fat. The HPDE group had greater weight loss (−2.3 ± 1.9 kg) than HPF (−1.8 ± 2.2 kg); while CG had increase in weight (1.8 ± 1.3 kg). In the end of study, HPDE group had significantly improved of TG, HDL, TG/HDL ratio and WHtR by −26.6 mg/dL, 12.7 mg/dL, −1.02, −0.02 respectively (p < 0.05). **Conclusion:** There were significantly difference between 3 groups, ΔTG (P = 0.008), ΔHDL (p = 0.001), and ΔTG/HDL ratio (p = 0.004) and WHtR (p = 0.001). The hypocaloric diet combined exercise have a beneficial for weight loss among young obesity.

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Adipocyte Fas Signaling Promotes Meta-Inflammation in Obesity Through Its Interaction With Bmx

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Keywords: Adipocyte · Fas signalling · Bmx · Inflammation · Obesity

Background: Obesity-related chronic low-grade inflammation contributes to metabolic disorders. We aimed to explore mechanisms by which the Fas signaling in adipocytes promotes inflammation. **Results:** We found that the expression of Fas was elevated in adipose tissues from high-fat diet (HFD)-fed obese mice via tumor necrosis factor-α (TNF-α). Inflammation response was attenuated in adipose tissues from global FasL deficient (gld) mice. In contrast, activation of Fas signaling by Fas-activating antibody promoted release of TNF-α and IL-6, without significant impact on adipocyte growth. Mechanistically, activation of NF-κB and MAPK pathways and release of TNF-α and IL-6 by Fas signaling was mediated by interaction of Fas with Bmx, a non-receptor tyrosine kinase. Phosphorylation of Fas at Tyr189 residue is required for its interaction with Bmx on SH2 domain. Further, knockdown of Bmx abolished the effects of Fas activation on proinflammatory response in adipocytes. Fas/Bmx complex involved in the adipose tissue inflammation via Fas at Tyr189 site and SH2 domain of Bmx. **Conclusion:** This study uncovers the proinflammatory effect of Fas/Bmx signaling pathway in adipocytes in obesity, and provides new clues for the development of new treatments for obesity-associated metabolic diseases.

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Soy Isoflavone Intake and Gut Microbiota Modulations Alleviate The Symptoms of Polycystic Ovary Syndrome (PCOS)

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Keywords: PCOS · Soy isoflavones · Resistant starch · Gut microbiota

Background: Polycystic ovary syndrome (PCOS) is the most common endocrine disorder found in the women of their reproductive age which has three symptoms; menstrual irregularity, hyperandrogenism and polycystic ovaries. Soy isoflavones (ISO) and equol have demonstrated positive effects on hormone-dependent conditions. Recent studies have indicated a relationship between gut microbiota and PCOS. In our study, we hypothesized that gut bacteria are responsible for PCOS symptoms and they could be alleviated by microbial metabolites of ISO. **Methods:** We used resistant starch (RS) to enhance and antibiotics (A) to reduce ISO metabolism. 7 weeks old female SD rats were divided into 7 groups. PCOS was induced in all groups (P, PS, PR, PSR, PA, and PSA) except Control (C) group using letrozole, orally. Then, diet treatments were done for 14 days (C, P = Control diet, S = 0.05% ISO, R = 11% RS, A = antibiotics). ISO alone and together with RS and antibiotics improved at least two out of the three PCOS symptoms. **Results:** The most notable observation was that PSR group improved all three PCOS symptoms. We also found that PSR group had a very high equol concentration compared to other groups, suggesting a potential relationship between PCOS and equol. Gut microbiota results revealed some discernable differences in bacterial genera between C and P groups, proposing some microbiota are responsible for PCOS. This supports the alleviation of PCOS symptoms after antibiotic treatment. **Conclusion:** In conclusion, we suggest that gut microbiota modulations and equol (ISO) could be used as potential alternative therapies for PCOS.

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Effect of Rice Bran Oil on Lipid Accumulation in Normal Rats

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Keywords: Rice bran oil · Lipid accumulation · Rats

Background: Rice Bran Oil (RBO) contains gamma-oryzanol which demonstrated a hypolipidemic effect of RBO on experimental rat. **Methods:** We tested whether RBO would also

has an effect on decreasing abdominal adipose tissue weight and size by inducing lipolysis. Twenty-one normal male rats at seven-week-old were fed a control diet and divided into a control group, a standard group (Orlistat 10.8 mg/kg bw/day), and a treatment group (RBO contain 57.6 mg oryzanol/day). The treatment was for 28 days. **Results:** There was no significant difference in growth performance (p > 0.05) and feed intake (p > 0.05) between groups. Treatment of RBO result in lower adipose tissue weight (1.23 ± 0.24 g) compared to control (1.41 ± 0.18 g). Moreover, RBO group has lowest mesenteric fat percentage (0.24 ± 0.05%) among groups (control = 0.34 ± 0.08%; standard = 0.28 ± 0.14%) but not statistically different (p > 0.05). In addition, there was no significant difference in adipose tissue size for all groups (p > 0.05). **Conclusion:** These results suggested that consumption of RBO in normal physiology state will not lead to lipid accumulation. However the effect on inducing lipolysis is still not confirmed.

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Piceatannol Attenuates Amyloidogenesis and Neuroinflammation in Brains of Diabetic Mice With Alzheimer's Disease-Like Alterations

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Keywords: Alzheimer's disease · Amyloidogenesis · Neuroinflammation · Piceatannol

Background/Aims: Cognitive impairment can be induced by increased levels of amyloidogenesis and inflammation in brain. The hypothesis of this study is that piceatannol (PIC) improves cognitive function by attenuating amyloid beta accumulation and neuroinflammation. **Methods:** To test this hypothesis, Alzheimer's disease (AD)-like alterations were induced by high-fat diet (HF) and streptozotocin (STZ)/nicotinamide (NAM) injection. Male ICR mice were fed with either standard diet or HF diet. After feeding the assigned diets for 6 weeks, vehicle or PIC was administered by stomach gavage with the assigned diets for additional 6 weeks. Behavioral tests to assess hippocampus function and memory/recognition function were conducted. **Results:** HF feeding for 12 weeks with STZ-NAM injection resulted in reduced brain weights and induced diabetic and AD-like alterations as shown by hyperglycemia and impaired cognitive function. Amyloid beta (Aβ) concentrations in brains were increased by HF feeding, which was accompanied by alterations in factors related to amyloidogenesis and inflammation. PIC treatment for 6 weeks increased brain weights and rescued HF-induced abnormal morphological changes including the presence of karyopyknosis and disorganized structural changes in brain sections of HF-fed mice. Aβ accumulation and levels of amyloid precursor protein and presenilin 1 were significantly reduced by PIC administration. Also, systemic and brain levels of inflammation-related markers were altered by PIC. Scores on nest building performance and spatial recognition test were significantly improved in PIC-treated mice. **Conclusion:** PIC significantly reduced amyloidogenesis

and neuroinflammation, and these alterations may contribute to the improved cognitive function in diabetic mice with AD-like changes.

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Resveratrol Suppresses Uterine Fibroid Cell Growth in Vivo and in Vitro

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Keywords: Uterine fibroids · Resveratrol · Extracellular matrix · ELT-3-LUC xenograft model

Background/Aims: Resveratrol (RSV) is a polyphenolic phytoalexin found in peanuts, grapes, and other plants. Uterine fibroids (UF) are benign growths that are enriched in extracellular matrix (ECM) proteins. We aimed to investigate the effects of RSV on UF using in vivo and in vitro approaches. **Methods:** In mouse xenograft models, tumors were implanted through the subcutaneous injection of Eker rat-derived uterine leiomyoma cells transfected with luciferase (ELT-3-LUC) in five-week-old female nude (Foxn1 nu) mice, which were randomly assigned to intraperitoneal treatment with RSV (10 mg/kg) or vehicle control (dimethyl sulfoxide). Tumor tissues were assayed using an immunohistochemistry analysis. Primary human leiomyoma cell viability was determined using the MTT assay. The protein expression was assayed using Western blot analysis. The mRNA expression was assayed using qRT-PCR. Cell apoptosis was assayed using Annexin V-FITC/PI and Hoechst 33342 staining. **Results:** RSV significantly suppressed tumor growth in vivo and decreased the proportion of cells showing expression of proliferating cell nuclear antigen (PCNA) and α-smooth muscle actin (α-SMA). In addition, RSV decreased the protein expression of PCNA, fibronectin, and upregulated the Bax/Bcl-2 ratio in vivo. Furthermore, RSV reduced leiomyoma cell viability, decreased the mRNA levels of fibronectin, and the protein expression of COL1A1 and α-SMA, as well as reducing the levels of β-catenin protein. RSV induced apoptosis and cell cycle arrest at sub-G1. **Conclusion:** Our findings indicated the inhibitory effects of RSV on the ELT-3-LUC xenograft model and indicated that RSV reduced ECM-related protein expression in primary human leiomyoma cells, demonstrating its potential as an anti-fibFrotic therapy for UF.

Profiling of Antioxidant Properties and α-Glucosidase Inhibitory of Gandaria Leaf Extracts At Different Maturity Stages

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Keywords: α-glucosidase · Antioxidant · Extraction solvent · Gandaria leaf

Background/Aims: Bouea macrophylla Griff. or plum mango or commonly known as gandaria leaves have been used as a traditional herbal medicine in Indonesia, Malaysia, and Thailand. No scientific reports are available on the antioxidant and α-glucosidase inhibition exhibited by maturity stages of gandaria leaves. **Methods:** In this study, extraction of these leaves used maceration method with different solvents (96% ethanol, ethyl acetate, n-hexane) and rotary evaporator to obtain crude extracts (CE). Total phenol, flavonoid content, antioxidant activity using ferric reducing antioxidant power (FRAP), and in vitro α-glucosidase inhibition of tender gandaria leaf (TGL) and mature gandaria leaf (MGL) from Indonesian Institute of Science were examined. Statistical differences among treatments were performed using analysis of variance (ANOVA) in triplicates. **Results:** The antioxidant compound analysis indicated n-hexane extracts of MGL contain the strongest total phenol (67.53 ± 1.19 mg gallic acid equivalent, GAE/g CE). The ethanol extracts of MGL demonstrated the highest of flavonoid content and FRAP (6.90 ± 0.72 mg quercetin equivalent, QE/g CE and 5.62 ± 0.38 mg FeSO4 equivalent/g CE, respectively). Ethyl acetate extracts of TGL inhibited α-glucosidase activity potently with IC50 value of 90.37 ± 4.97 ppm. **Conclusion:** These findings show antioxidant properties of TGL and MGL extracts by inhibiting α-glucosidase in addition might have the potential to be developed as functional foods in the future.

Weight Gain Due to High Fat High Fructose (HFHF) Diet Has The Potential to Decrease The Brain Nerve Cell Number of Male Sprague Dawley (SD)

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Keywords: Brain nerve cells · High fat high fructose · Increased body weight

Background/Aims: Consumption of foods and drinks rich in energy, fat and/or sugar beyond the recommendation can cause obesity. An obesity condition triggers the incidence of brain nerve cell death related to oxidative stress, high levels of TNF-α and triglycerides, and low HDL levels in obese individuals. Progressive nerve cell death causes decreasing cognitive performance. This study aimed to prove that HFHF modified AIN-93M diet administration as a cause of obesity can decrease the number of brain nerve cells. Decreasing number of nerve cells indicates progressive nerve cell death. **Methods:** An experimental study using a control group post-test design was carried out on male Sprague Dawley (SD). Samples were selected using simple random sampling to divide into two groups, namely "AIN-93M modified HFHF diet" P1 group (n = 14) and "AIN-93M standard" P2 group (n = 16). The measured variable was the number of visible nerve cells in the SD rats' brains stained using Hemotoxylin Eosin (HE), scanned with 400x magnification in the hippocampus area. Followed by counting the nerve cell number in 10 visual fields using "Cell_Count" application. The results were analyzed by using the SPSS with Pearson correlation test. **Results:** The results show that rats in P1group had a greater weight gain and fewer brain nerve cells than those in P2group. Pearson correlation analysis results p-value = 0.023 (<0.05), r = –0.413. **Conclusion:** This study concludes that the increase in body weight due to the AIN-93M HFHF diet modification is associated to decreasing number of nerve cells in rat brain.

Physiological Effects and Organ Distribution of 1-Deoxynojirimycin From *Bacillus amyloliquefaciens* AS385 in C57Bl/6J Mice

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Keywords: 1-Deoxynojirimycin · Bacillus amyloliquefaciens AS385 · Physiological effects · Organs uptake

Background/Aims: 1-Deoxynojirimycin (DNJ), an iminosugar mainly found in mulberry leaves, has been known for its a-glucosidase inhibitory activity. Mulberry leaves, however, only contains small amount of DNJ, thus prompting the search for alternative source that can produce higher amount of DNJ. Previously, we were able to produce culture broth powder (CBP) containing DNJ from *Bacillus amyloliquefaciens* AS385, a strain which is commonly found in fermented food product. **Methods:** In the present study, we evaluated the physiological changes and DNJ distribution in organs after 5-week of CBP intake. CBP was prepared by culturing *B. amyloliquefaciens* AS385 in culture broth containing 4% soybean peptone and 5% sorbitol for 5 days, followed with treatment using anion exchange resin and freeze-drying to yield CBP containing (1% DNJ). We then evaluated the physiological effects of CBP-supplemented diet (equivalent to 10 mg DNJ/kg BW/day) intake in male C57BL/6J mice for 5 weeks. **Results:** CBP intake tended to suppress the elevation of blood glucose level during oral glucose tolerance test and significantly reduced the fasting plasma glucose level and white adipose tissue mass. We also found detectable amount of DNJ in various organs, with highest disposition in intestine and kidney. **Conclusion:** Based on these evidences, it is most

likely that accumulation of DNJ in organs contribute to the shift in blood glucose and adiposity in C57BL/6J mice. Overall, this study suggested the utilization of CBP as functional food product. Currently, we are also evaluating the effectivity of CBP against high-fat diet-induced metabolic disorders in C57BL/6J mice.

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Caffeic Acid Derivatives Inhibit The Proliferation of Triple Negative Breast Cancer Cells Through Dual Suppression of EGFR And C-Met Signaling Pathways

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Keywords: Ethyl caffeate · Decyl caffeate · Triple negative breast cancer · EGFR · c-Met · c-myc

Background/Aims: Breast cancer is the most incident cancer in women around the world. Patients with triple negative breast cancer (TNBC) have poorer prognosis and overall survivals compared with HER[+] or hormone receptor positive breast cancer. Recent studies indicate that caffeic acid derivatives including Ethyl caffeate (EC) and Decyl caffeate (DC) naturally isolated from honeybee propolis, may exert beneficial effects through anti-inflammatory activity. In this study, we demonstrate the inhibitory effects of EC and DC on the proliferation of TNBC cells. **Results:** Our results suggest that EC and DC significantly inhibit cell proliferation, colony formation and cell migration. EC and DC induce cell cycle arrest at G1 phase through a reduction of cell cycle regulatory proteins in TNBC cells. EC and DC induce apoptosis in MDA-MB-468 cells via induction of Bax, c-caspase-3 and c-PARP-1 proteins. EC and DC inhibit the phosphorylation of Akt and ERK1/2 signaling molecules and suppress the expression of downstream c-Myc and Slug proteins by dual blockade of EGFR and c-Met signaling pathways. Our results also demonstrate a synergistic effect of cisplatin (a chemotherapeutic drug) and caffeic acid derivatives on the suppression of cell survival in MDA-MB-468 cells. Moreover, caffeic acid derivatives inhibit the expression of FASN protein through an augmented phosphorylation of AMPK protein. Consumption of DC significantly inhibits the growth and metastasis of mammary tumors and reduces the accumulation of visceral fat in a mouse xenograft model. These finding demonstrate that novel CA derivatives effectively act as chemopreventive agents against human TNBC cells *in vitro* and *in vivo*.

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Soyasaponins Modulate the Toll-Like Receptor 4 Signaling in Palmitate-Induced Inflammatory Macrophages

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Keywords: Soyasaponin · Inflammation · Toll-like receptor 4 · Macrophages

Background/Aims: Soyasaponins (SS) are phytochemicals exhibiting many beneficial health effects. Recent studies indicate that SS reduce inflammation probably through regulating toll-like receptor 4 (TLR4) signaling pathway. However, the modulatory effect of SS on TLR4 signaling is not fully understood. Here, we aimed to investigate the effects of three different types of SS (A1, A2 and I) on TLR4 signaling. **Methods:** The RAW264.7 murine macrophages were pre-incubated with graded concentrations (10, 20 and 40 µmol/L) of SS (A1, A2 and I) for 2 h and then stimulated with 200 µmol/L of palmitate (PA). The molecules (TLR4, MD-2, CD14, TIRAP, MyD88, TRAM, TRIF, p-IRAK4, p-IRAK1 and TRAF6) in TLR4 signaling pathway were assessed by Western blotting. **Result:** The 10~40 µmol/L of SS (A1, A2 and I) inhibited PA-induced increase of MyD88 ($P < 0.05$). SS-A1 (20~40 µmol/L) and SS (A2 and I) (10~40 µmol/L) suppressed PA-induced increase of p-IRAK4 ($P < 0.05$). The PA-increased p-IRAK1 levels were blocked by 10~40 µmol/L of SS (A1, A2 and I) ($P < 0.05$). Interestingly, PA stimulation for a short time (10 min) significantly increased TRAF6 levels, which was blunted by SS-I (10~40 µmol/L) ($P < 0.05$). Moreover, PA stimulation for a long time (12 h) decreased TRAF6, which was blocked by SS (A1 and A2) (10~40 µmol/L). Together, these results showed that SS can modulate the levels of MyD88 and TRAF6, and the phosphorylation of IRAK4 and IRAK1 in TLR4 signaling in inflamed macrophages. This study contributes to some novel understanding of the SS's anti-inflammatory mechanism.

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Evaluation of γ-Oryzanol Accumulation And Lipid Metabolism of Mouse Following A Long-Term Administration of γ-Oryzanol

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Keywords: γ-oryzanol · Rice bran oil · HPLC-MS/MS · Lipid-lowering effect

Background/Aims: γ-Oryzanol (OZ), a mixture of ferulic acid esters of plant sterols and triterpene alcohols, is abundant in rice bran and rice bran oil. While most studies have investigated the beneficial effects of OZ (e.g., lipid-lowering effects), the absorption and metabolism of orally ingested OZ was remained unclear. Previously, using the HPLC-MS/MS, we detected the presence of intact OZ in mice plasma after single oral administration of OZ. From this result, we hypothesized that part of the ingested OZ is directly absorbed into the blood stream in intact form and most likely to contribute to its physiological effects in vivo. **Methods:** To prove our hypothesis, we fed two types of diet containing different concentrations of OZ (normal and high concentration) to high-fat diet-induced obese mice for 8 weeks and analyzed the OZ concentration in mice plasma and organs using HPLC-MS/MS. To determine the correlation between OZ accumulation and lipid metabolism, we also investigated the changes in lipid parameters in plasma and liver. **Result:** As results, we found the accumulation of intact OZ in plasma and organs of mice fed with diet containing OZ, with mice in high-dose group having higher accumulation of OZ and lower level of plasma triacylglycerol. These findings in combination with our additional data from the single oral administration test suggest the role of biologically active form of OZ, including its intact form and its metabolites (e.g., ferulic acid), in exerting the observed physiological activity.

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Role of DNA Methylation in Skeletal Muscle Regeneration during Atrophy

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Keywords: DNA methylation · Epigenetics · Atrophy · Knock-out mouse

Background: Muscle atrophy is associated with aging, malnutrition and chronic unloading as well as nerve injury. During atrophy, the muscle regeneration capacity after injury (e.g., falling, trauma, or extreme exercise) is known to be decreased. However, the mechanism involved is largely unknown. DNA methylation is an epigenetic mechanism regulating gene expression. **Methods:** Generally, DNA methylation of the gene promoter is correlated with transcriptional repression. In this study, we observed that Dnmt3a (DNA methyltransferase3a) expression is decreased after muscle atrophy. We made skeletal muscle-specific Dnmt3a knockout mice (Dnmt3a-KO mice). The regeneration capacity after muscle injury was markedly decreased in Dnmt3a-KO mice. Diminished mRNA and protein expression of Dnmt3a were observed in skeletal muscles as well as in satellite cells, which are important for muscle regeneration, in Dnmt3a-KO mice. Dnmt3a-KO satellite cell showed smaller in size (length/area), suggesting suppressed myotube differentiation. **Result:** Microarray analysis of satellite cells showed expression of growth differentiation factor 5 (Gdf5) mRNA was markedly increased in Dnmt3a-KO mice. The DNA methylation level of the Gdf5 promoter was markedly decreased in Dnmt3a-KO satellite cells. In addition, DNA methylation inhibitor azacytidine treatment increased Gdf5 expression in WT satellite cells, suggesting Gdf5 expression is regulated by DNA methylation. Also, we observed increased Id (Inhibitor of differentiation, a target of Gdf5) mRNA expression in Dnmt3a-KO satellite cells. Thus, Dnmt3a appears to regulate satellite cell differentiation via DNA methylation. This mechanism may play a role in the decreased regeneration capacity during atrophy such as in aged sarcopenia and malnutrition. (FASEB J 32:1452-1467, 2018.)

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Branched-Chain Amino Acids Suppress Fatty Liver Induced by Low Protein Diet in Mice

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Keywords: BCAA · Low protein diet · Fatty liver · Mice

Background: We have found that fatty liver induced by low protein diet was alleviated by supplementing with branched-chain amino acids (BCAA). Effect of BCAA to increase energy expenditure by accelerating protein turnover in the skeletal muscle is a hypothesized mechanism to suppress fatty liver. The aim of this study is to clarify the effect of BCAA supplementation on protein metabolism in the liver and skeletal muscle in mice fed low protein diet. **Methods:** Male C57BL/6 mice of 8 weeks old were divided into 7 groups and fed control diet with 15% casein, low protein diet with 3% casein or low protein diet supplemented with BCAA (36%, 52%, 68%, 84%, 100% of the control diet) for 10 days. After dissection, hepatic lipid contents were measured. mTOR activity (phospho-S6K), autophagy activity (LC3 II/I) and expression of genes were measured to evaluate protein metabolism. Result: Hepatic triglyceride content was increased by feeding low protein diet and was suppressed to the control level in all BCAA-supplemented groups. mTOR activity was upregulated in accordance with BCAA intake in the liver and to the same level in all BCAA- supplemented groups in the skeletal muscle. Hepatic gene expression of insulin-like growth factor (IGF)-binding protein-1 was suppressed by

BCAA, suggesting that IGF-1 activity was elevated. Autophagy activity was downregulated by BCAA in both liver and skeletal muscle. **Conclusions:** BCAA supplementation to low protein diet increases net protein synthesis in skeletal muscle which may increase energy expenditure in muscle and suppress fatty liver.

Caulerpa lentillifera Ameliorates Inflammation in Mice via Modulating TLR4 Signaling Pathway

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Keywords: Alcoholic liver disease · *Caulerpa lentillifera* · Inflammation · Toll-like receptor 4

Background/Aims: Alcohol abuse not only brings on hepatic fat accumulation but also contributes to upregulating the proinflammatory cascade, which may accelerate the progression of liver disease. *Caulerpa lentillifera* (CL), naturally distributed in tropical and subtropical regions, is an edible green algae and rich in polysaccharides. CL has exhibited many biophysiological potentials but limited studies in liver diseases is available. The aim of the study was to investigate the effects of CL and its polysaccharide component on hepatic injury and inflammation in a chronic plus single binge alcoholic liver disease model. **Methods:** C57BL/6 mice were assigned to four groups and pair-fed with isocaloric control liquid diet (C), ethanol liquid diet (E), ethanol liquid diet plus CL (ES) or equivalent polysaccharide (EP) in ES for 3 weeks. **Results:** At the end of the study, we found significant increase of circulating endotoxin in the E group comparing to the C group (p < 0.05), whereas no difference among ES, EP and C groups was found (p > 0.05). Likewise, we found group E had higher hepatic proinflammatory cytokine concentrations than other groups (p < 0.05). Moreover, we also found that both CL and its polysaccharide extract decreased ethanol-induced elevation of TLR4 protein expression (p < 0.05). We further used Wistar rats to confirm the effects of CL polysaccharide on alcohol absorption and found that it did not directly influence the absorption of ethanol (p > 0.05). **Conclusion:** Dietary CL may ameliorate ethanol-induced hepatic inflammation by inhibiting TLR4 pathway by its polysaccharide component.

Effect of *Strobilanthes crispus* Extract on Triglyceride Levels in Streptozotocin-Induced Diabetic Rats

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Keywords: *Strobilanthes crispus* · Diabetes mellitus · Triglyceride

Background/Aims: *Strobilanthes crispus* has been used traditionally as antidiabetic. This study aimed to determine the recommended dose of *S. crispus* extracts, to find out the effect of *S. crispus* extracts during 2 weeks of treatment toward triglyceride alterations and to determine the effect of glibenclamide toward triglyceride alterations level of diabetic rats. **Methods:** This method was true experimental design with pre-test – post-test control group design. A total of 30 streptozotocin-induced hyperglycaemic rats were used. The rats were divided into five groups. K1 was the negative control group, K2 the positive control group, K3 the glibenclamide group, K4 the treatment group 1 with an extract dose of 32 mg/200 g body weight (BW), and K5 the treatment group 2 with an extract dose of 168 mg/200 g BW. Data were analyzed with paired t-test to determine the alteration in triglyceride levels. One Way ANOVA statistics was then used to compare the repeated measurement values in the same group. Duncan Multiple Range Test (DMRT) was used to determine whether the treatment has more effect on changes in triglyceride levels. **Results:** The K3 group has the highest effectiveness in reducing triglyceride levels with 29.2 mg/dL and K5 group lowering triglyceride levels by 20.5 mg/dL (p < 0.05). K4 group reduced triglyceride levels by 1.9 mg/dL (p > 0.05). **Conclusion:** The K3 and K5 groups had significant and effective results in reducing triglyceride levels while the K4 group did not have a significant result in reducing triglyceride levels.

Anti-Inflammatory Effects of *Lycium barbaruma*'s Leaf Extract with Chlorophyll Removal in Lipopolysaccharide-Stimulated RAW264.7 Cells and Animal Model

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Keywords: *Lycium barbarum* · Chlorophyll removal · Anti-inflammation

Background/Aims: Plants are rich sources of diverse compounds with health-promoting properties. They can be used as source materials for functional foods and cosmetics. The Lycium's fruits which also called Goji berry or wolfberry and Lycium's root are well-known traditional Asian medicines with anti-inflammatory and anti-senile effects. The extract of Lycium's leaves has also been reported to have anti-oxidant and anti-inflammatory activities. However, chlorophyll in leaves may act as an anti-oxidant or a pro-oxidant depending on the presence of light and causes un-

desirable color in cosmetics and tea. We investigated the anti-inflammatory effect of Lycium's leaf extract with(LLCh-) or without(LL) chlorophyll removal. **Methods:** Inhibitory effects of the leaf's extracts on pro-inflammatory mediator production were estimated in lipopolysaccharide (LPS)-stimulated RAW264.7 cells and BALB/c mice. The expression of iNOS, COX-2, NF-κB p65 and p-NF-κB p65 were evaluated in LPS-stimulated RAW264.7 cells. **Results:** The LL and LLCh- inhibited the production of pro-inflammatory mediators (NO, TNF-α and IL-6, IL-1β) and the expression of iNOS, COX-2, NF-κB p65 and p-NF-κB p65 in LPS-stimulated RAW 264.7 cells in a dose-dependent manner. Furthermore, the administration of LL and LLCh- inhibited serum pro-inflammatory cytokine levels and suppressed DNA damage in BALB/c mice. In particular, LLCh- showed the highest anti-inflammatory activity. **Conclusion:** These results suggested that chlorophyll free-leaves of *Lycium barbarum* may have potential as a health functional foods or a therapeutic agent with anti-inflammatory activity.

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Calcium Bioavailability of Tempe and Boiled Soybean Flours and Its Effect on Osfemurs in Rats

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Keywords: Tempe flour · Boiled soybean flour · Calcium bioavailability · Osfemurs

Background/Aims: Tempe is a nutritious food that contains both macronutrients and micronutrients in adequate amount. Tempe contains a high amount of calcium which is very affordable and could be reached by all people in Indonesia. Calcium deficiency can lead to several diseases and disorders such as osteoporosis, hypertension, heart disease, and nerve damage. The aims of this study were to evaluate: (1) the calcium bioavailability (absorption and retention) of tempe and boiled soybean flours as compared to casein (control), (2) the effect of tempe and boiled soybean flours on blood calcium and osfemurs in rats. **Methods:** This study was conducted using rats as a model. Rats were divided into four treatment groups based on the sources and protein concentrations in the diet; tempe flour 10% protein, tempe flour 20% protein, boiled soybean flour 10% protein, and casein 10% protein as a control. This experiment was conducted over 90 days. **Results:** Protein sources (casein, tempe flour, and boiled soybean flour) and protein level in the diet (10% and 20%) had no significant effect (p > 0.05) on calcium absorption, calcium retention, calcium content in serum, calcium content in osfemurs, and total calcium in osfemurs. **Conclusion:** Tempe flour and boiled soybean flour can be consumed as a calcium source to substitute the consumption of calcium from cow milk.

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Antioxidative Activity and Restoration Ability on Oxidative Damaged PC12 Cells of Yuzu (*Citrus junos*) Paste

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Keywords: Yuzu · *Citrus junos* · Antioxidative activity · PC12

Background/Aims: Squeezed Yuzu juice is available as a product in Japan, and the residue containing peel and seed is often disposed as industrial waste. Therefore, we conducted experiments aiming at effective utilization of Yuzu paste which containing not only juice but peel and seed. **Methods:** Measurement of hydroxyl radical scavenging capacity by ORAC method: Samples were assayed according to Ou et al. with some modifications. Examination of recovery effect on oxidative damaged PC12 cells: PC12 cells were cultured in DME medium containing lipid peroxide derived from soybean lecithin (PO). After 48 h of incubation, the medium was replaced in with a fresh DME medium containing 0–1.0% Yuzu paste. The cell viability was assessed using Cell Counting Kit-8. **Results:** The ORAC value of Yuzu paste was lower than that of other polyphenol components. We confirmed the recovery effect with Yuzu paste by cultivating PC12 cells that had been damaged by 50 μm PO in the medium supplemented with the paste. **Conclusions:** We confirmed that Yuzu paste had the effect of recovering the PC12 cells injured by PO. On the other hand, it was found that the oxygen radical absorbance capacity of Yuzu paste was lower than other polyphenol components such as neohesperisin. Further investigations are needed to clear the mechanism of antioxidant action of Yuzu paste.

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Low-FODMAP Nutritional Ingredients For IBS and Gut Sensitive Populations

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Keywords: Irritable bowel syndrome · Low-FODMAP · Resistant starch · Dietary fiber

Background/Aims: Among functional gastrointestinal disorders, irritable bowel syndrome (IBS) is becoming a global phenomenon. Although IBS prevalence is higher in Western populations, its annual rate of incidence is expanding in Asian countries. The low-FODMAP diet is emerging as a first line of therapy for IBS patients. FODMAP's are fermentable oligo, di, mono and polyols, commonly found in fruits, vegetables, legumes and nuts. Consumption of FODMAPs leads to gastrointestinal symptoms such as abdominal pain, bloating and altered bowel movements. IBS causes are multifold – could be resulting from bacterial fermentation of FODMAPs, their osmotic effects due to poor absorption and visceral sensitivity of gut. Dietary fiber continues to be important nutrient in daily diet. However, populations with intestinal

hypersensitivity and IBS patients cannot consume fibers which are high in FODMAPs. Thus, fibers which have low-FODMAP's such as resistant starches (RS) can be formulated to offer low-FODMAP food and beverages to IBS patients and populations with gut sensitivity. **Results:** Currently, low-FODMAP testing and certification of ingredients and foods products is offered by Australian organizations. VERSAFIBETM 1490 resistant starch, NOVELOS-ETM 3490 resistant starch, (resistant starch type-4) and HI-MAIZE® 260 resistant starch (resistant starch type 2) from various sources (potato, tapioca and corn) qualify as low-FOD-MAP ingredients. **Conclusion:** The low-FODMAP certification will propel product development and innovation, expanding the potential of this diet from niche to main-stream market.

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Health Belief Model Offers Opportunities For Designing Weight Management Interventions For Obesity Patients

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Keywords: HBM · Obesity · Diet · Nutrition

Background/Aims: 135 adult obese patients participated in a 4 week program, "HBMOP" which integrated the HBM through one-on-one Health Coaching sessions. **Methods:** The remaining 64 of 135 obese patients were given routine diet support and general nutrition counseling. **Results:** Obese patients who received the HBMOP had a significant increase in their physical exercise status, nutrition scale score and the THBMOS 's Perceived Benefits (p < 0.001) and Self-Efficacy scores(p = 0.004). Obese patients who received the HBMOP had a significant decrease in their body mass index (BMI) (p = 0.040), waist circumference (p = 0.006), the TH-BMOS's Perceived Barriers (p < 0,001). But in these parameters were not significant change in obese patients who were given routine diet support and general nutrition counseling (p > 0.05). Obese patients who received the HBMOP according to other group had a significant increase at nutrition scale points(p < 0.001). **Conclusion:** HBMOP helps obese patients to exercise more physical, lose weight and reduce waist circumference. HBMOP improving THBMOS's some sub-dimensions and nutrition scale points.

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Increase of The Expression of Glucose Transporter 4 (GLUT4) by Torbangun Leaves Extract in Hyperglycemic Rats

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Keywords: Torbangun · Hyperglycemic · Gene expression · GLUT4

Background/Aims: The condition of diabetes mellitus reduces insulin sensitivity which causes a decrease in GLUT4 gene expression. Torbangun leaves extract (TE) is known to have antidiabetic potential but its effect on GLUT4 gene expression is not yet known. The study aimed to determine the effect of TE in increasing GLUT4 gene expression in hyperglycemic rats. **Methods:** The study used a completely randomized design using Spraque Dawley rats. Most rats, except the normal group, were induced by streptozotocin and confirmed on the third day after induction with fasting blood glucose levels above 126 mg/dl. Rats were divided into four groups, namely NG (hyperglycemia rats), N (normal rats), H-IM (metformin 62.5 mg/kg BW), and H-IT (TE 620 mg/kg BW). Metformin and TE have been given through a sonde for 14 days. Fasting blood glucose levels were taken on days 0, 4th, 7th, 11th, and 14th. Necropsy was performed on day 15th for collection of the soleus muscle. Changes in GLUT4 gene expression were determined by rt-PCR. Differences in blood sugar levels before and after the treatment were analyzed by T-test, while gene expression were analyzed descriptively. **Results:** Fasting blood sugar levels in the H-IT group showed a significant decrease (p = 0.005). GLUT4 gene expression in the H-IT group increased by 1.58 times and in H-IM 1.91 times compared to the hyperglycemia group (NG). **Conclusion:** The administration of Torbangun leaves extract has an effect on reduction in blood glucose levels through increasing in the expression of GLUT4 gene.

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The Effects of Chinese Herbs on Apoferritin-Mediated Macrophages Activation and Iron Exporter Ferroportin-1 Expression

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Keywords: Traditional Chinese herb · Ferroportin · THP-1 macrophage

Background/Aims: Elevated serum ferritin is regarded as acute phase reactant and is commonly associated with obesity. Our previous work finds that both ferritin and apoferritin trigger macrophages activation. Macrophages play important role in iron metabolism and activated macrophages are associated with iron dysregulation due to the imbalance of hepcidin-ferroportin (Fpn1) axi. Angelica sinensis and Rhizoma Ligustici are widely used Chinese herbal medicine for treating anemia. Chinese herbal formula B401 is a commercially available supplement which exerts anti-inflammatory function. In this study, we investigated the effects of Chinese herbs (B401, Angelica sinensis and Rhizoma Ligustici) on iron efflux in macrophages. **Methods:** The human myelomonocytic cell line THP-1 cells were differentiated into macrophages by 6.25 ng/mL phorbol 12-myristate 13-acetate. Apoferritin was used as positive stimuli to trigger macrophages activation (e.g. IL-6) and various concentrations of Chinese herbs were added concomitantly. **Results:** Chinese herb B401 (5–20 mg/mL) inhibited apoferritin-mediated upregulation of IL-6 (29 folds, p < 0.01) in THP-1. Besides, Chinese herb B401 also upregulated membrane Fpn1 expression as detected by flow cytometry. Both Angelica sinensis (100–200 μg/mL) and Rhizoma Ligustici (50–500 μg/mL) inhibited apoferritin-mediated IL-6 release in activated macrophages (8 and 11 folds, respectively; all p < 0.01). However, neither of them could upregulate Fpn1 expression in apoferritin-mediated activated macrophages. **Conclusion:** These results suggest that all of the Chinese herbs investigated could inhibit apoferritin-mediated IL-6 secretion, but only B401 could upregulate membrane Fpn1. Future works are needed to investigate the bioactive compounds of B401 in the regulation of Fpn1.

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Effects of Dietary Protein Levels on Lipid Metabolism in Rats Kept Under Constant Darkness

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Keywords: Darkness · Protein · Lipid · Rats

Background/Aims: This study aimed to determine the effects of a low-protein diet on lipid metabolism in rats kept under constant darkness. **Methods:** Fifty 4-week-old female rats were divided into four groups (n = 12 or 13 per group), and each group was fed a diet with one of two protein levels: low level (5% casein) and normal level (20% casein). The four groups were N5%, N20%, D5%, and D20%. The two N groups were kept under normal 12/12 h light/dark cycles (7:00 - 19:00, light period), while the two D groups were kept in constant darkness. At the end of 4th week, the rats were euthanized at 14:00, 20:00, 2:00, and 8:00. (n = 3 or 4 per group), and the liver and blood were collected. **Results:** The serum triglyceride levels of the D5% group had a tendency of higher than that of the N5% group. Hepatic triglyceride levels in the D5% group were lower than those in the N5% group. Srebp1 messenger RNA (mRNA) expression in the liver was lower in the D5%, D20%, and N20% groups. The expression of Acc and Fas mRNAs at 20:00 in the D5% group was lower than that in the N5% group. ApoC3 mRNA expression was showed high value in the D groups and the 20% groups. These results showed that the rats fed with a low-protein diet and kept under constant darkness exhibit decreased lipid synthesis in the liver and increased serum triglyceride levels, which was induced by inhibition of lipoprotein lipase by ApoC3.

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Effects of Butyrate on Sucrase-Isomaltase Gene Expression in Intestinal Epithelial Cells

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Keywords: Small intestine · Histone acetylation · Disaccharidase · Butyrate

Background/Aims: Starvation reduces intestinal mucosal weight and the expression of digestion/absorption-related genes. Butyrate is known to inhibit histone deacetylases, and likely to promote histone acetylation around intestine-specific genes. In this study, we have investigated the effects of re-feeding a diet containing butyrate on the expression of sucrase-isomaltase gene (Si) in the jejunum of starved rats. **Methods:** Six-week-old SD male rats were fasted for 3 days and re-fed a control diet or a diet containing 5% butyrate for 12 or 24 h. The jejunum was collected for the measurement of mRNA levels, and the quantification of histone acetylation and the bindings of acetylated histone binding protein BRD4 and transcription elongation factor CDK9. Re-feeding a diet containing butyrate led to increases in the mRNA levels of Si and histoneH3 acetylation around Si in 12 h, and the bindings of BRD4, CDK9 and RNA polymerase II phosphorylated at Ser2 in 24 h. In another experiment, confluent human intestinal carcinoma cell line, Caco2 was cultured in a low glucose medium, and then cultured for 12 or 24 h in media supplemented with 24 mM fructose, with various concentrations (0.625–20 mM) of butyrate. The experiments were repeated with media containing HDAC inhibitor Tricostatin A (TSA) at 1 μM. **Results:** Supplementation of 1 μM TSA, as well as 5–10 mM butyrate, evoked an increase in Si mRNA level in Caco2 cells. The results suggest that butyrate enhances the expression of Si through increasing the acetylation of histone H3 and the binding of transcription elongation factors around Si.

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Assessing Micronutrient Intake of Children Under Five in Java Indonesia

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Keywords: Micronutrient · Neutron activation analysis · Daily intake · Recommended dietary allowance

Background/Aims: Malnutrition is more responsible for poor health compared to other causes. This could lead to reduce immunity, productivity and the main causes of the global burden of disease. It is also known that micronutrient deficiency is a major cause of growth faltering. According to Indonesia nutritional status monitoring on 2017, around 29.6% of Indonesian children under five are stunted (the fifth – highest number in the world). Therefore, the assessment of micronutrient status of the children is needed to carry out to assess their daily intake. **Methods:** In this research, food samples were collected using duplicate diet method of 120 children in Bandung West Java and Lebak Banten district which have more than 26% cases of stunting. Then, the samples were analyzed using the neutron activation analysis method for Se, Fe and Zn. Quality control of data analysis was assessed using SRM NIST 1548a Typical Diet. **Results:** It is generally concluded that these children are still lack of micronutrient intake especially Fe and Zn, and many of them are under the recommended dietary allowance. **Conclusion:** The results are expected to be used as reference to encourage governments and relevant agencies to make policies for improving public health and malnutrition solutions as well.

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Central Obesity, Smoking and Their Associations With HDL Level among Indonesian Adults

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Keywords: HDL levels · Central obesity · Smoking

Background/Aims: High-Density Lipoprotein (HDL) is high lipoprotein, particularly protein. It produced in the liver and small intestine. HDL subtracts cholesterol and phospholipid in blood and transfer into other lipoproteins for transporting back or out from the body. NCEP ATP III conducted low HDL with <40 mg/dl. As one of the criteria metabolic syndrome (MS), it's important to know best effort to get high HDL level in blood. Several studies have found that dietary, smoking and physical activity were main determinants in improving HDL level. The purpose of this study was determined the main determinants for improving HDL levels, based on Riskesdas's data in 2013 with range 18–59 years old. Determinants were age, physical activity, dietary of fruits and vegetables, coffee consumption, central obesity, smoking, dietary of fatty food, marital status, and sex. **Methods:** This study used the cross-sectional design, with 21,055 samples from Riskesdas in 2013. Data analyzed with multiple regression logistic for the prediction model. **Results:** In the last model, central obesity, smoking, dietary of fatty food, marital status and sex significantly associated with HDL level (in sequence on OR). Central obesity and smoking are main determinants on HDL level after adjustment for others significant determinants with OR 95% CI (1.948 [1.740–2.182]; pvalue<0.0001 and 1.284 [1.127–1.462]; pvalue<0.0001). Central obesity was the main determinant lower HDL level. **Conclusion:** This study suggested to maintain waist circumference in <80 cm for women and <90 for men with balanced nutrition (lower intake of fatty foods), avoid smoking and improving physical activity, especially for married women.

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Rice Bran Ameliorates Obesity and Modulates Lipid Metabolism in High-Fat-Diet-Induced Obese Rats

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Keywords: Rice bran · Obesity · Lipid metabolism · Lipidomics

Background/Aims: The high obesity associated morbidity has heightened interest in discovering natural food compounds to maintain health. Rice bran (RB) has shown beneficial effect against hypertension, improvement in brain function and regulation in pancreatic secretion. Our aim was to investigate the obesity-lowering effect of rice bran on high-fat high-fructose diet (HFFD) induced obesity in obese rats. **Methods:** Male Sprague Dawley rats were randomly divided into 5 groups (n = 8 per group): standard diet (Control), HFFD and 0.5X, 1X, and 2X of RB enriched diet for 8 weeks. Obese and their lean littermates fed a chow diet were used as controls (Control and HFFD, respectively). **Results:** RB-1X and RB-2X supplemented diet exhibit similar effect in alleviating HHFD induced obesity, hyperglycemia, hyperuricemia and high BUN level (P < 0.05). A RB-enriched diet alleviated the adipocyte-size distribution pattern in epididymal adipose tissues, shifting it toward smaller sizes. In addition, administration of RB-supplemented diet induced obesity in rats significantly affected the phospholipid biosynthesis and sphingolipid metabolism pathways to modulate hyperlipidemia. Taken together, our data demonstrate that rice bran treatment is able to ameliorate diet-induced obesity. **Conclusion:** Our study further demonstrates the potential value of RB as a nutraceutical food in controlling body fat formation.

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In Vitro Metabolism of 3,5,7,8,3',4'-Hexamethoxyflavone by Rat Liver Microsomes

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Keywords: Hexamethoxyflavone · Metabolism · Rat liver

Background/Aims: We previously reported that the metabolism of nobiletin (5,6,7,8,3',4'-hexamethoxyflavone), a flavonoid found in the peels of the Citrus group, proceeded via demethylation by cytochrome P450 (CYP), CYP1A and CYP3A enzymes. Here, we examined the metabolism of an isomer 3,5,7,8,3',4'-hexamethoxyflavone (GHM) using rat liver microsomes and the effect of three CYP inducers, phenobarbital (PB), 3-methylcholantrene (MC) and dexamethasone (DEX), on GHM metabolism. GHM was synthesized by the methylation of gossypetin (3,5,7,8,3',4'-hexahydroxyflavone). **Methods:** Liver microsomes were prepared from untreated, PB-treated, MC-treated and DEX-treated rats. GHM was incubated for 20 min at 37°C with rat liver microsomes, NADPH and HEPES buffer (pH 7.4) under aerobic conditions. After addition of methanol, the incubation mixture were centrifuged to remove the denatured protein and the supernatants were applied to LC-UV and LC-MS to analyze the metabolites. **Results:** Total nine metabolites were produced by four kinds of rat liver microsomes. LC-MS revealed that they consisted of three mono-demethylated (M4, M3 and BM3), four di-demethylated (M6, M5, BM1 and BM2), one tri-demethylated (M2) and one mono-hydroxy-mono-demethylated (M1) metabolites. Among them, M3, M4 and M6 were major metabolites in untreated and PB-treated rats and PB-treatment increased M3, M4, M6 and BM3 significantly. In contrast, MC-treatment markedly increased M4, M1, BM2 and BM1, and also resulted in the appearance of M2 and BM2 newly. DEX-treatment increased M4, M3 and BM3. **Conclusion:** These results suggested that GHM metabolism proceeds by the continuous three oxidations consisting of demethylation and hydroxylation and similarly to nobiletin, CYP1A and CYP3A enzymes are most important in GHM metabolism.

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The Dosage of The Avocado Leaf Extract (*Persea americana Mill*.) on Regineration of Diabetic White Rats (*Rattus norvegicus*) Renal Cell

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Keywords: Avocado leaf extract · Diabetes mellitus · Renal hispatology

Background/Aims: Antioxidant activity in Avocado leaves plays a role in improving insulin work in controlling blood glucose levels. This study aimed to analyze the effect of doses of avocado leaf extract on the regeneration of diabetic rat renal cells. **Methods:** Experimental method was used with 18 male white rats as subjects. White rats were divided into 6 groups: Treatment G1: Feed + STZ (Streptozotocin) + Sucrose 10% + Avocado leaf extract dose of 100 mg/kg body weight + Na-CMC 0.5%, G2: Feed + STZ + Sucrose 10% + Avocado leaf extract 150 mg/kg body weight + Na-CMC 0.5%, G3: Feed + STZ + Sucrose 10% + Avocado leaf extract dose 200 mg/kg body weight + Na-CMC 0.5%, G4: Feed + STZ + 10% sucrose + Na-CMC 0.5%, G5: Feed + STZ + 10% sucrose + Glibenclamid + Na-CMC 0.5%, and P6: Feed. Mann Whitney test (p < 0.05) was used in the data analysis. **Results:** The results showed that the average renal damage of rats in the rat group was G1 =1.66; G2 =1.33; G3 = 0; G4 =3; P5 = 0; P6 =0. Score 0 = no damage. Score 1 = mild renal cell damage (1/3 cell part); score 2 = moderate renal cell damage (2/3 cell parts); score 3 = severe renal cell damage (>2/3 cell parts). **Conclusion:** The treatment of G3 with a dose of 200 mg/kg body weight avocado leaf extract gives a relatively effective influence on regenerating STZ-induced renal cell rats, compared to other doses.

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Nutritional Support with Immune-Modulating Formula in Head and Neck and Esophageal Cancer Patients Undergoing Radio-Chemotherapy: A Retrospective Clinical Study

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Keywords: Immune-modulating Enteral Nutrition (IEN) · Standard Enteral Nutrition (SEN) · Radio-chemotherapy (RCT) · Evidence-based medicine (EBM)

Background/Aims: Malnutrition is frequent in head and neck (HN) and esophageal cancer patients and aggravated by radio-chemotherapy (RCT), increasing morbi-mortality and treatment toxicity. Recent studies suggest that the immune, nutritional or inflammatory status may be modulated by the use of pharmaconutrients in RCT-treated cancer patients. Our goal was to investigate the effect of immunonutrition consisting of an arginine, omega-3 fatty acid, nucleotides-enriched diet on nutritional status in HN or esophageal cancer patients undergoing RCT. **Methods:** A retrospective study of 88 radio-chemotherapy (RCT) patients were enrolled, they received either an Immune-modulating Enteral Nutrition (IEN) (IMPACT formula) or a Standard Enteral Nutrition (SEN) (isonitrogenous and isoenergetic formula). Anthropometrical parameters, nutritional risk index (NRI), serum albumin, and functional capacity were recorded between the beginning and the end of RCT. **Results:** About 45% of patients were moderate to severe malnutrition (NRI <97.5) at the beginning of RCT in SEN (n = 19) and IEN groups (n = 21) alike. Significantly NRI improved in malnourished IEN patients (97.35 ± 11.96 vs 98.03 ± 12.05, p = 0.021). There was also a significant difference in body weight (BW)

between the two groups, BW increased (65.40 ± 14.85 vs 66.37 ± 14.32, p = 0.03) in IEM patients but reduced (62.34 ± 12.30 vs 61.73 ± 12.05, p = 0.023) in SEM patients. **Conclusion:** This study shows that EN enriched in pharmaconutrients (arginine, EPA, DHA, nucleotides) had a more potent effect than standard EN in preventing deterioration of nutritional status during RCT, particularly in malnourished patients.

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The Formation of Endogenous and Exogenous Advanced Glycation End-Products From Non-Nutritive Sweeteners

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Keywords: Advanced glycation end-products · Glyoxal · Fructosamine · Non-nutritive sweeteners

Background/Aims: Advanced glycation end-products (AGEs) are posttranslational modification of carbonyl groups of reducing sugars and free amino groups of proteins. AGEs are formed endogenously as a normal aging process or during food processing (exogenous) and ingested via diet contributing to circulating and tissue AGEs in the body. Non-nutritive sweeteners (NNS) are commonly used to replace sugars in the diet and food system, so this study aimed to investigate if NNS attenuate the formation of AGEs both endogenously and exogenously. **Methods:** In the endogenous model, NNS (xylitol, sorbitol, aspartame, sucralose) were incubated with bovine serum albumin, while the exogenous model used a cookie model. Fructose was used as positive control. The formation of protein-bound fluorescent AGEs and their intermediates (glyoxal and fructosamine) were determined using spectrophotometry. Ne-(carboxymethyl)lysine (CML) and Ne-(carboxyethyl) lysine (CEL) were determined in both models using liquid chromatography-mass spectrometry. In the endogenous model, aspartame did not form any AGEs or intermediates, while sucralose significantly increased protein-bound fluorescent AGEs. **Results:** Xylitol and sorbitol significantly increased all AGE biomarkers compared to the respective controls. In the exogenous model, AGE formation was significantly lower in all NNS, but the formation of glyoxal and fructosamine was significantly higher in sucralose and greater than two-fold compared to fructose. **Conclusion:** This experiment demonstrated that NNS, like reducing sugars, formed AGEs and their intermediates. This may be explained by the chemical structures of these NNS. Different NNS form AGEs, glyoxal and fructosamine through different pathways. In-vivo studies are needed to confirm findings from this in-vitro experiment.

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Effects of Germinated *Chenopodium formosanum* on Dmh-Induced Colon Carcinogenesis in Rats

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Keywords: *Chenopodium formosanum* · Germination · Colon cancer · Aberrant crypt foci

Background/Aims: Colorectal cancer (CRC) is a leading cause of cancer death in Taiwan. Polyphenol-rich diets are convinced to reduce CRC risk. *Chenopodium formosanum* (djulis) is a Taiwanese traditional crop abundant in polyphenols. Previous studies showed that djulis was able to reduce aberrant crypt foci (ACF), an early-stage colon cancer marker. Germination is a widely used process to increase nutritional value of cereals. This study investigated the effect of germinated djulis on colon cancer prevention. **Methods:** Djulis seeds were treated with a 3-day sprouting process. For the in vivo experiment, 68 male F344 rats were accommodated for one week and randomly divided into 6 groups (n = 9–12). Groups B and C were given AIN-93G diet, and groups L, M and H were fed with AIN-93G containing 5%, 10% and 20% germinated djulis, respectively. Group P was given AIN-93G containing 10% ungerminated djulis as positive control. Rats in group B were injected with 0.9% saline and others were injected with 1,2-dimethylhydrazine (40 mg/kg body weight, i.p.) once a week for 5 weeks. After ten weeks of feeding, all animals were sacrificed and liver, kidney, colon, and serum were collected for further analysis. **Results:** Germination significantly increased total polyphenolics, γ-aminobutyric acid and free amino acids including branched-chain amino acids and lysine in djulis. Compared to group C, groups P and L significantly reduced total number of ACF. **Conclusion:** These results suggest that germination may enrich nutritional value of djulis seeds. Moreover, germinated djulis may reduce colonic preneoplastic lesions. Germinated djulis has the potential as nutraceutical application.

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Change in Metabolite Levels Related To Sarcopenia in The Skeletal Muscles of Aged Mice

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Keywords: Skeletal muscle · Sarcopenia · Metabolomics

Background/Aims: Sarcopenia is an age-induced, progressive loss of skeletal muscle mass and function. In aged populations, which are increasing in many developed countries, prevention/cure of sarcopenia is important. **Methods:** To better understand the changes in skeletal muscle during sarcopenia, we conducted metabolomic analysis of skeletal muscles in young (8 weeks-old) and aged (28 months-old) mice by CE-TOFMS. Changes were observed in the metabolite levels of various metabolic pathways, including glucose, phospholipid, polyamine, neurotransmitters, and amino acid metabolism. **Results:** The products of glucose metabolism decreased in aged mice, i.e., fructose 1,6-diphosphate (0.4-fold), dihydroxyacetone phosphate (0.6-fold). The decrease was concomitant with decreased expression of the glycolytic enzymes. Multiple metabolic products associated with phospholipid metabolism significantly changed in aged mice, which may reflect changes in cell membrane phospholipids of the skeletal muscle with aging. In addition, products of polyamine metabolism, which are known to increase nucleic acid and protein synthesis, decreased in spermine (0.5-fold) and spermidine (0.6-fold) levels, which are associated with decreased expression of polyamine metabolic enzymes. The levels of neurotransmitters acetylcholine (1.8-fold), serotonin (1.7-fold), and histamine (2.6-fold) significantly increased in the skeletal muscles of aged mice. **Conclusion:** The increase of neurotransmitters might be due to dropout of neuromuscular junctions and a muscle injury that occurred during aging. Further analysis focusing on the altered metabolites observed in this study will provide essential data for understanding aging muscles, with potential applications in preventing sarcopenia.

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The Effects of Tocopherols on Inflammation and Thermogenesis in Brown Adipocytes

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Keywords: Tocopherol · Brown adipocyte · UCP1 · PGC-1α · Thermogenesis

Background/Aims: Adipose tissue is characterized as either white adipose tissue (WAT) or brown adipose tissue (BAT). White adipocytes have large lipid droplets and few mitochondria, whereas brown adipocytes have multilocular lipid droplets and a large number of mitochondria containing uncoupling protein 1 (UCP1).

BAT functions as a radiator for thermogenesis to maintain body temperature, development and activation of BAT have been considered an attractive target for weight loss and metabolic disease treatment. Inflammatory cytokines including TNF-α, IL1-β and IL15 impair brown adipogenesis, and its loss the thermogenic capacity in BAT. Therefore, inhibition of inflammation is very important in normal thermogenesis and prevention of metabolic diseases. Tocopherols, especially α-tocopherol and δ-tocopherol (α-toc and δ-toc) have been shown to have anti-inflammatory effects. In this study, we investigated the effects of tocopherol analogs on thermogenesis in rat brown adipocytes. **Methods:** Rat primary brown preadipocytes were differentiated with the induction media in the presence or absence of tocopherols. And then, cells were stimulated by TNF-α for 24 hours. **Results:** Protein expression of UCP1 was decreased by TNF-α stimulation, but the decrease was significantly suppressed in α-toc or δ-toc treated cells. The decrease of PGC-1α protein, an important transcriptional factor for thermogenesis, due to inflammation was significantly suppressed in δ-toc treated cells. These results suggested that tocopherols improve the dysfunction of BAT due to the inflammation. Currently we are investigating the effects of tocopherols in mouse BAT and will report these results collectively.

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Colocasia esculenta Leaf Extract Inhibits Erythrocyte Aldose Reductase Activity and Increase Haemoglobin in Rat

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Keywords: *Colocasia esculenta* · Diabetes · Aldose reductase · Haemoglobin

Background/Aims: Diabetes Mellitus (DM) in the world has reached 382 million in 2013, expected to rise to 592 million by 2035. Chronic diabetes can lead to impaired formation of erythropoietin as forming haemoglobin and may cause anemia. Inhibition of aldose reductase is a key point of diabetes treatment and prevention of complications in diabetes. *Colocasia esculenta* (CE) leaf is one of Indonesian vegetables which have inhibitory aldose reductase activity. **Methods:** This research was a true experimental study with post test only group design. 21 male Sprague dawley rat divided into: K (control group), P1 (extract CE 200 mg/KgBW) and P2 (extract CE 400 mg/KgBW). Rats were induced to become obese with High Fat Sucrose Diet (HFSD) for 4 weeks then extract CE were given for 3 weeks.The data was analyzed with the independent t Test. CE have significant effect to increase haemoglobin but have no significant effect to erythrocyte aldose reductase. **Results:** The results of this research found that the mean haemoglobin of control group was 13.14 ± 1.55, treatment group 1 (P1) was 15.22 ± 0.59, and treatment group 2 (P2) was 15.77 ± 0.71. There was significant increase of haemoglobin(p < 0.05). The mean of

aldose reductase of treatment group was lower than control group, however there was no significant difference (p > 0.05) between the groups. 200 mg/kgBW and 400 mg/kgBW dose of CE could increase haemoglobin and decrease the mean of aldose reductase.

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Metabolomic Analysis of C2C12 Myoblasts Induced by The Transcriptional Factor FOXO1

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Keywords: FOXO1 · Metabolomic analysis

Background/Aims: The transcriptional factor FOXO1 plays important roles in the regulation of energy metabolism in various tissues when the whole body energy is exhausted, such as during fasting. For example, in the liver, FOXO1 maintains blood glucose levels by increasing the expression of the gluconeogenic enzymes. In adipose/muscle tissues, FOXO1 increases the expression of the lipoprotein lipase, an enzyme that utilizes triglycerides. In the skeletal muscles, FOXO1 increases the expression of genes related to ubiquitin-proteasome and autophagy and promotes muscle proteolysis and amino acid production. Thus, FOXO1 appears to play roles in adaptation to starvation in various tissues. In this experiment, we used C2C12 myoblasts expressing FOXO1-estrogen receptor fusion protein, which is activated by tamoxifen. **Methods:** To clarify the metabolic changes due to the activation of FOXO1 in muscle cells, we comprehensively analyzed the metabolic profile using CE-TOFMS and measured the changes in the metabolites. Further, we analyzed the expression of genes associated with metabolism using RT-qPCR. In this study, we observed the changes especially in glycolysis and amino acid metabolism. **Results:** In FOXO1-activated cells, the metabolite level of glycolysis was higher. Additionally, the expression of pyruvate dehydrogenase kinase, an enzyme that inhibits glucose utilization, increased. Activation of FOXO1 promoted muscle protein and amino acid usage, and the metabolite levels of the amino acids decreased. **Conclusion:** Thus, our data suggests that FOXO1 suppresses glucose utilization and promotes the use of proteins/amino acids for energy source in muscle cells, possibly during starvation.

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Fermented Rice Bran Improves Glucose and Lipid Profile in High-Fat Diet Induced Metabolic Syndrome in Rats

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Keywords: Metabolic syndrome · High-fat diet · Rice bran · Fermentation

Background/Aims: Fermentation of red rice bran has been reported to have higher anti-diabetic activities compared with the unfermented one. However, the effect of fermented red rice bran in alleviating metabolic syndrome condition is scarce. Here we investigate the anti-metabolic syndrome properties of fermented red rice bran in rats fed high-fat diet. **Methods:** Twenty (n = 20) Sprague dawley rats aged 4 weeks were randomly allocated into control, high fat diet (positive control), high fat diet+fermented rice bran 10% (FRB-10) and high fat diet+rice bran 10% (RB-10). Blood was drawn after 4 weeks of high fat diet and after 3 weeks intervention for blood pressure, serum glucose, total cholesterol, triglyceride, HDL and LDL. Adipose tissue was removed for diameter, total adipocytes count and SREBP-1c mRNA analysis. Systolic blood pressure was measured before and after treatment. **Results:** Serum glucose, total cholesterol, triglyceride, LDL and systolic blood pressure were significantly (p < 0.001) lower and HDL level was significantly (p < 0.001) higher compared with positive control group in all treatment groups. FRB-10 group has the lowest serum glucose (99.4 ± 2.5), total cholesterol (124.4 ± 4.4), triglyceride (103.5 ± 3.6), LDL (28.7 ± 1.3), systolic blood pressure (90 ± 1.6) and highest HDL level (62.1 ± 2.1) compared with RB-10 or positive control group. The diameter and adipocyte counts were not significantly (p = 0.96 and p = 0.26 respectively) different between FRB-10 and RB-10. The gene expression of SREB-1c is lower in FRB-10 (FC = 0.3 ± 0.2) compared to control group. **Conclusion:** Fermented rice bran improves metabolic profile and regulates the gene required for lipogenesis in high fat-diet induced metabolic syndrome.

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Gene-Stress Interaction of FTO and VEGFR-2 Gene Polymorphisms With Mental Health Influences Blood Lipids in Chinese Malaysian Female Adults

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Keywords: FTO gene · VEGFR-2 gene · Mental health · Blood lipids

Background/Aims: Female adults in Malaysia have a higher risk of cardiovascular disease (CVD) and mental health problems. Fat mass and obesity-associated (FTO) and vascular endothelial growth factor receptor-2 (VEGFR-2) genes were found to be associated with CVD and depression. Hence, this study examined the interaction influences of FTO (rs1477196) and VEGFR-2 (rs2071559) gene polymorphisms with mental health on metabolic CVD risk factors in Chinese Malaysian female adults. **Methods:** Physical measurements: body mass index and blood pressures; and biomarkers: glycated hemoglobin (HbA1c), total cholesterol (TC), triglycerides, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol (HDL-C) and TC/HDL-C ratio were determined. The Depression, Anxiety, and Stress Scale (DASS-21) questionnaire was used to measure mental health (stress, anxiety and depression). Genotyping of rs1477196 and rs2071559 was performed by real-time PCR using Taqman probes. A total of 81 Chinese Malaysian females aged 30–65 years old were included. **Results:** The allele frequencies for rs1477196 (A; G allele) and rs2071559 (C; T allele) were 0.29; 0.71 and 0.41; 0.59 respectively. The mean scores for DASS-21 (stress, anxiety and depression) showed normal levels. The rs2071559 was significantly associated with HbA1c levels (p = 0.034) after adjusting for potential confounders but there were insignificant associations of rs1477196 with metabolic CVD risk factors (p = 0.080–0.886). Significant interactions were obtained for rs1477196 with both stress (p = 0.048) and depression (p = 0.041) on TC/HDL-C ratio levels including rs2071559 with both stress (p = 0.015) and depression (p = 0.038) on HDL-C levels. **Conclusions:** The significant interactions of FTO and VEGFR-2 genes with mental health had influences on blood lipids, which are major risk factors of CVD.

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Whiteleg Shrimp Shell Powder Ameliorates Adiponectin, Lipid Profile, and Triglyceride-to-HDL Ratio in Diabetic Wistar Rat

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Keywords: *Litopenaeus vannamei* · Powder · Adiponectin · TG-to-HDL ratio

Background/Aims: Adiponectin, a bioactive molecule produced by adipose tissue, has a potential in increasing insulin sensitivity. Adiponectin concentration drops as the body mass index (BMI) increase, resulting in Type 2 Diabetes Mellitus (T2DM) and its complications. Triglyceride-to-HDL ratio (TG:HDL) may be used as a predictor for cardiovascular (CVD) risk to T2DM patient. Whiteleg (*Litopenaeus vannamei*) Shrimp shell contains astaxanthin, a potential antioxidant. This study aimed to determine the effect of *Litopenaeus vannamei* shrimp shell powder (LVSP) on improving adiponectin, lipid profile, and TG:HDL of diabetic Wistar rat. **Methods:** Twenty five male Wistar rats were divided into five equal groups: control negative (C-), control positive (C+), Treatment 1 (T1), Treatment 2 (T2), and Treatment 3 (T3). C+, T1, T2, and T3 were maintained on a high-fat-diet for 14 days before streptozotocin (STZ) injection. T1, T2, and T3 were given two different doses of LVSP and astaxanthin supplement, respectively. **Results:** STZ injection revealed a significant (p < 0.05) elevation in total cholesterol, Triglyceride, and low-density lipoprotein compared to (C-) group. Moreover, serum adiponectin and HDL were significantly reduced, increasing value between TG:HDL (p = 0.000). Higher dose of LVSP showed more effective effect on improving all parameters than the lower dose. Compared to astaxanthin supplement, higher dose of LVSP gave the same effect on increasing adiponectin levels. **Conclusions:** The result of the study indicates that LVSP contained astaxanthin may act as a functional food that can ameliorate adiponectin, lipid profile, and TG:HDL associated with T2DM, and also lowering risk of CVD in T2DM.

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Resistant Protein Modulates Glucose-Like Peptide-1 Secretion and Short-Chain Fatty Acid Profile in Rats Fed High-Amylose Corn Starch

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Keywords: Glucagon-like peptide-1 (GLP-1) · High-amylose corn starch (HACS) · Resistant protein · Short chain fatty acids (SCFAs) · Microbial fermentation

Background/Aims: We examined whether protein source in the diet affects glucagon-like peptide-1 (GLP-1) concentration in portal vein blood and cecal fermentation in rats fed high-amylose corn starch (HACS, amylose = 68%). Proteins with different digestibilities, casein and dashigara (the protease-undigested fraction of smoked, dried skipjack tuna, namely resistant protein), were investigated. The apparent digestibilities of casein and dashigara are 96.0% and 84.5%, respectively. **Methods:** Rats were fed one of three experimental diets for 28 d: common cornstarch with casein, HACS with casein and HACS with dashigara. **Results:** Food intake and body weight gain were not influenced by diet. The total amount of short chain fatty acids (SCFAs) in the cecal contents, GLP-1 concentration in portal vein and fecal bile acid excretion were all significantly increased in rats fed HACS with casein compared with rats fed common cornstarch (amylose = 26%) with casein. The amount of total SCFAs, propionic and butyric acid in the cecal contents, fecal bile acid excretion and GLP-1 concentration in portal vein blood were significantly greater in rats fed HACS with dashigara compared with rats fed HACS with casein. A large amount of succinic acid was found in the cecal contents of rats fed HACS with casein, but not in rats fed HACS with dashigara. **Conclusions:** These results suggest the physiological functions of undigested but easily fermented carbohydrates such as HACS are influenced by the ingestion of undigested protein, namely resistant protein.

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Cytotoxic Activity of Fermented Black Rice Bran Extract on Human Colon Adenocarcinoma Cell Line (WiDr)

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Keywords: Black rice bran · Fermented rice bran · Colon cancer · WiDr

Background/Aims: Colon cancer is the second leading cause of death in the world. The development of this disease starting from cells mutations keep to divide and becoming uncontrolled. Black rice content of dietary fiber and bioactive compound as antiproliferation of colon cancer cells, and these are more detected in fermented rice bran. The aim of this study were to evaluate the effect of the fermentation process in increasing bioactive compound, and to evaluate fermented rice bran and non-fermented which more potential inhibited the proliferation of colon cancer cells WiDr. **Methods:** In this study, consisted of two stages, namely preparation of samples black rice bran without fermented and fermented with two inoculum of R. oryzae and tempeh laru; Characterization of functional properties and cytotoxy activity analysis of extract material on WiDr cells and Vero cells. **Results:** The results of this study showed that the increase in a number of bioactive compounds during fermentation process. **Conclusions:** The extract of fermented rice bran was also very effective against colon cancer cells WiDr when compared to non-fermented, and it was relative safe to normal cells Vero.

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Water and Lipid-Soluble Component Profile of *Sargassum cristaefolium* from Different Coastal Areas as Basic Knowledge for Selecting Anti-Inflammatory Potential Candidate

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Keywords: Anti-inflammatory · Coastal area · Lipid-soluble · PCA · *Sargassum cristaefolium* · Water-soluble components

Background/Aims: *Sargassum* is known to have many health benefits and therapeutic effects, but its utilization in Indonesia is still not optimal. Preliminary chemical characterization of this sea-

weed is important to do because this relates to prospecting strategy for seaweed industry development. This study aimed to evaluate chemical composition profiles of *Sargassum cristaefolium* from four different coastal areas, namely Pari Island/PI, Awur Bay/AB, Ujung Genteng Beach/UGB and Sayang Heulang Beach/SHB. **Methods:** Sampling was undergone on same monsoon season (March-April 2017). Observed parameters included proximate, crude fiber, acid-soluble ash, total sugar, yield of alginate and fucose-containing sulphated polysaccharide (FSCPs), FCSPs' sugar profile, total phenolic, pigment profile, and fatty acid profile. **Results:** Principle component analysis (PCA) on water-soluble component variables made samples from southern waters (SHB and UGB) and northern waters of Java (AB and PI) to be clearly distinguished (axes F1 and F2: 75.85%). SHB and UGB were characterized by high content of ash, alginate, FCSPs, and FCSPs' fucose content, while samples from northern waters had a high amount of total sugar and crude fiber. PCA result on lipid-soluble components showed different tendency that SHB and AB samples were located at close point and characterized by larger blade size, higher content of chlorophyll, fucoxanthin, carotenoid, PUFA, total n-3 fatty acids, total n-6 fatty acids, and higher ratio of n-3 to n-6 (axes F1 and F2: 77.36%). **Conclusions:** The overview of each samples' chemical characteristics can be used as basic knowledge for further development, especially their use as a source of anti-inflammatory ingredients.

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Quercetin is Effective For Improving Dietary Advanced Glycation End Product Induced Cognitive Impairment in Aged ICR Mice

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Keywords: Quercetin · Dietary advanced glycation end product · Cognitive impairment

Background/Aims: Although debate still exist in regards to the risk of dietary advanced glycation end products (DAGE) on human health, there is evidence suggest that DAGE worsen cognitive function in Alzheimer's disease (AD) mouse model. The aim of the study is to determine 1) whether DAGE would induce cognitive impairment in aged ICR mice; and 2) the protective effects of quercetin against DAGE induced cognitive impairment. **Methods:** A total of 32 ICR mice (15 month old) were randomly divided into four groups i.e. ICR mice with AIN-93G diet, DAGE diet (DAGE), quercetin supplemented AIN-93G diet, and with AIN-93G diet supplemented with both quercetin and DAGE. The intervention period is 16 weeks. **Results:** Compared to control group, DAGE group had increased latency to find platform, and reduced number of crossing for morris water maze test; and quercetin intervention was able to improve the above markers. DAGE group had increased phosphorylation of tau at serine 396 and 404, and increased GFAP from both hippocampus and cortex, meanwhile DAGE group also had increased miR-15a, and reduced miR-132& miR-218. Quercetin intervention was able to improve p-tauser396&404, and GFAP, as well as reduce miR-15a and increase miR-132& miR-218 expression. **Conclusions:** Dietary advanced

glycation end products induced cognitive impairment in aged ICR mice, quercetin intervention was effective for improving DAGE induced cognitive dysfunction. This might be associated with quercetin intervention improved tau pathology and neuro-inflammation, additionally altered miRNA expression including miR-15a, miR-132 and miR-218 might be involved in how quercetion intervention improved cognitive function.

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Soy Isoflavones Stimulate PGC-1β-Mediated Energy Expenditure Gene Expression

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Keywords: PGC-1β · Muscle cells · Isoflavone · ERR · Mitochondria

Background/Aims: PGC-1β is a transcriptional co-activator of nuclear receptors such as the estrogen receptor-related receptor (ERR). Transgenic overexpression of PGC-1β in mice increases energy expenditure and suppresses high-fat diet-induced obesity. Therefore, PGC-1β is a promising target for developing functional foods to counter obesity. In this study, we screened various food-derived and natural compounds using a reporter assay system to measure the transcriptional activity of PGC-1β. **Methods:** We used PGC-1β fused with a GAL4 DNA-binding domain, which allows the measurement of transcriptional activation of PGC-1β in the presence of various compounds in the culture medium. We used 166 commercially available compounds (final concentration, 10 μM), examined the reporter activity, and compared it with that of the vehicle. **Results:** Among them, soy-derived isoflavones, genistein and daidzein, and several resveratrols activated PGC-1β. Genistein, daidzein, and trans-oxyresveratrol activated ERR-responsive element-mediated reporter activity in the presence of PGC-1β. Stable overexpression of PGC-1β in C2C12 myoblasts increased the expression of medium-chain acyl-CoA dehydrogenase (MCAD), an important enzyme in fatty acid β-oxidation, as well as mitochondrial staining, as assessed using MitoTracker Red (increased strength of the fluorescence signal). **Conclusions:** Genistein and daidzein further increased MCAD mRNA levels and mitochondrial content in PGC-1β-expressing C2C12 cells. These compounds activated ERR/PGC-1β complex-mediated gene expression, and our findings may be a practical foundation for developing functional foods targeting obesity. (Biochemistry and Biophysics Reports 17:51–55, 2019).

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Sodium Butyrate Induces Autophagy in Colorectal Cancer Cells Through LKB1/AMPK Signaling

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Keywords: Sodiumbutyrate · Autophagy · Colorectal cancer · Liver kinase B1 (LKB1) · AMP-activated protein kinase (AMPK)
Background/Aims: Butyrate is produced by the fermentation of undigested dietary fibers and acts as the promising candidate for cancer treatment. However, the mechanism underlying sodium butyrate (NaB)-induced autophagy in colorectal cancer is not yet completely understood. **Methods:** The expressions of LC3-II protein and mRNAwere detected by western blot and quantitative RT-PCR in colorectal cancer (CRC) cell lines HCT-116 and HT-29, respectively. Autolysosome formation was observed by transmission electron microscope. AMPK and LKB1 were inhibited by chemical inhibitor or siRNAs and confirmed by western blot. **Results:** NaB elevated the protein and mRNA expressions of LC3 in a dose-dependent manner. NaB treatment increased the formation of autolysosome and expression of phosphorylated liver kinase B1 (LKB1), AMP-activated protein kinase (AMPK), and acetyl-CoA carboxylase (ACC). Treatment with compound C (an inhibitor of AMPK) and siRNA-mediated knockdown of AMPK and LKB1 significantly attenuated NaB-induced autophagy in CRC cells. **Conclusions:** Collectively, these findings indicated that LKB1 and AMPK are critical for NaB-mediated autophagy and may act as the novel targets for colorectal cancer therapy in the future.

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Effects of Probiotic Supplementation on Serum Trimethylamine-N-Oxide Level in Healthy Young Adults: A Double Blinded Randomized Controlled Trial

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Keywords: Probiotic · Randomized controlled trial · Phosphatidylcholine challenge test · Trimethylamine-N-oxide (TMAO)
Background/Aims: Trimethylamine-N-oxide (TMAO), a gut-flora dependent metabolite of choline, is associated with several diseases. Probiotics supplementation could modify intestinal flora composition, but whether it can influence TMAO level is ambiguous. We examined the effects of four specific probiotic strains on the serum concentration of TMAO and its precursors trimethylamine (TMA), choline, betaine after a phosphatidylcholine challenge test (PCCT). **Methods:** Forty healthy males (20–25 years old) were enrolled in the study and randomized into either probiotic group (1.32×10¹¹CFU live bacteria totally each day) or control group for a 4-week intervention. All participants received a PCCT by administrating two boiled eggs before and after probiotic intervention. TMAO and its precursors (TMA, choline, betaine) were quantified by UPLC-MS/MS. Participants in two groups were bal-anced at baseline characteristic. After PCCT, serum TMAO, TMA, choline, betaine were all markedly elevated regardless of probiotic intervention. **Results:** After probiotic intervention, no differences were observed on TMAO elevation between two groups, but a less elevation and lower total conversion capacity of serum choline ($P = 0.047$ and $P = 0.031$, respectively) were found in probiotic group during the PCCT period. After probiotic supplementation, gut flora production of TMAO and its precursors were not different between two groups after PCCT, neither did their production change were observed. **Conclusions:** Probiotic supplementation could not alter the urine excretion of all metabolites. No effect of one-month probiotics supplementation was observed on serum TMAO reduction, but serum free choline decreased after probiotic intervention. More studies of probiotic effect on TMAO and its precursors are needed to be performed.

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Muscular Endurance Performance and Physiological Effects on Minimum Dosage of Caffeine Ingestion

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Keywords: Muscular endurance · Caffeine · Circuit resistances training
Backgound/Aims: Various studies documented the effect of caffeine on sports especially endurance performance, nevertheless insufficient studies document the muscular endurance performance and physiological effects on minimum dosage of caffeine ingestion. The objective of the study was to identify the muscular endurance performance and physiological effects on minimum dosage of caffeine ingestion in amateur runners. **Methods:** A total of 36 male amateur runners aged 20–25 years old were recruited and randomly divided into three groups (caffeine, non-caffeine and placebo, n = 12/groups) using stratified sampling method based on pre-treatment of circuit resistance training (CRT) performance results. Caffeine group received treatment for caffeinated drink that contain minimum 3 mg/kg body weight dose of caffeine. Non-caffeinated and placebo group received non-caffeinated drink and plain water, respectively. The CRT, a measurement of muscular endurance was performed by all subjects following 40 minutes ingestion of treatment drinks. Total volume weight lifted (TVWL) and time of completion (TC) of CRT were recorded. Heart rate (HR) and water balance (WB) were measured before and after CRT. Body weight difference between before and after CRT was used to determine sweat rate (SR). **Results:** The results show the ingestion of caffeine increased TVWL ($p < 0.05$), TC ($p < 0.05$) and HR ($p < 0.05$). However, caffeine did not change SR ($p > 0.05$) and WB ($p > 0.05$) following ingestion. **Conclusions:** This study concludes that the acute ingestion of caffeine (3 mg/ kg) was effective to improve the muscular endurance performance.

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Immunomodulaory Activities of Okra Mucilage (*Abelmoschus esculentus (L.) Moench*) in THP-1 Macrophage

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Keywords: Okra mucilage · Indigestible polysaccharide · Immunomodulatory activity · THP-1 macrophage

Background/Aims: It is speculated that the heath promoting properties of okra mucilage are caused by indigestible polysaccharide. Pectin was reported to be the main cell wall component of okra. The aim of this study was to examine immune modulating properties of in vitro digested okra mucilage (OMD) on THP-1 macrophages.The chemical composition (moisture, protein, pectin and total phenolic compounds) of okra mucilage (OM), isolated from the steamed okra pods (*Abelmoschus esculentus (L.) Moench*), was determined. **Results:** Pectin, as the main cell wall component of okra, was found to be present in a concentration of 75.29 ± 0.30 g kg-1 dry basis in OM. After passing OM through a simulated in vitro digestive system, the molecular weight remained similar to that of before digestion, indicating the presence of indigestible polysaccharides. After stimulating THP-1 macrophages at resting stage with OMD, pro-inflammatory cytokine genes; IL-1β, IL-8 and TNF-α, were up-regulated. Phagocytosis of fluorescently-labeled polysaccharide in OMD has been visualized within 0.5 h of incubation. **Conclusions:** Our results suggested that okra mucilage has ability to modulate the immune system examined in in vitro.

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SIRT1 as A Potential Biomarker for Obesity

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Keywords: SIRT1 · Obesity · Percentage Body Fat (PBF) · Visceral Fat Area (VFA)

Background/Aims: Asian people generally have thin figures; however, they often suffer from metabolic syndromes due to high visceral fat area (VFA), which further promotes diabetes and atherosclerosis manifestation. Conventional VFA analysis expose patients to radiation, inconvenient procedure, and expensive cost. By contrast, blood samples are easily accessible; and indeed, influenced by diet and obesity. The gene responsible for regulating lipolysis, SIRT1, was affected after acute high-fat and high-calorie meal consumption. However, the chronic effect is yet to be confirmed. Therefore, we aimed to assess SIRT1 as a blood-based biomarker to predict obesity. **Methods:** This cross-sectional study involved 38 healthy subjects (20–30 years old, not suffering any chronic diseases, not taking any medication, not smoking, not drinking alcohol frequently, not being pregnant and not breast-feeding). Dietary patterns from 24-hours food recall, international physical activity questionnaire (IPAQ) data, medical check-up records, and body compositions from InBody720; were compared with SIRT1 expression from peripheral blood mononuclear cells (PBMCs). **Results:** Subjects with excessive percentage of body fat (PBF) had significantly higher body mass index (BMI) (normal: 20.28 ± 2.09, excessive: 23.86 ± 3.71, P = 0.023) and VFA (normal: 48.00 ± 9.38, excessive: 79.17 ± 16.14, P = 5 x 10–5). The SIRT1 expression was significantly higher in subjects with excessive PBF (normal: 1 ± 0.43, excessive: 3.68 ± 2.62, P = 0.018) and positively correlated with PBF (ρ = 0.376, P = 0.045). **Conclusions:** SIRT1 acted as a potential biomarker for obesity in the evaluated population; yet, further study employing larger subjects are necessary to confirm the correlation.

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Association of FTO rs9939609 and CS36 Rs1761667 with Visceral Obesity

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Keywords: CD36 rs1761667 · FTO rs9939609 · Visceral obesity · Fat consumption

Background/Aims: In 2016, more than 1.9 billion adults were overweight; of which, over 650 million were obese. Genetics and lifestyle play important roles in developing obesity. Studies have shown that genetic variants may predispose ones to develop obesity; such as FTO and CD36, which regulate metabolism and food preference. Various researches have also emphasized the importance of lifestyle in obesity prevention. However, interaction of both factors were still under-explored. Therefore, we aimed to assess the interaction between FTO-CD36 variants and fat-consumption on metabolic status of healthy Indonesians. **Methods:** Twenty-one females and seventeen males were involved in this cross-sectional study. CD36 rs1761667 and FTO rs9939609 genotypes were identified from blood samples using PCR-RFLP. Data were compared with dietary patterns (24-hours food recall), physical activities (IPAQ), medical records, and body compositions (InBody720). **Results:** CD36 rs1761667 AA and AG group showed higher -but not significant- fat consumption, WHR, and VFA compared to GG. The trend persisted after gender and physical activity adjustment. Meanwhile, FTO rs9939609 AT group showed significant higher WC, WHR and VFA in male subjects after gender and energy balance adjustment: WC (TT: 74.40 ± 3.85, AT: 85.50 ± 5.92, P = 0.011), WHR (TT: 0.85 ± 0.02, AT: 0.92 ± 0.04, P = 0.010), and VFA (TT: 48.65 ± 10.61, AT: 78.48 ± 15.18, P = 0.010). CD36 rs1761667 might be correlated with higher fat consumption and visceral obesity; meanwhile FTO rs9939609 showed

significant association with male visceral obesity. **Conclusions:** These results indicated that both genetic variants were potential as visceral obesity markers.

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A Randomized Crossover Trial Comparing The Effects of Yellowstripe Scad and Salmon on Lipid and Inflammatory Profiles among Healthy Overweight Adults

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Keywords: Dietary fish · Omega-3 fatty acids · Lipid and inflammatory profiles · Healthy overweight adults · Randomised crossover trial

Background/Aims: It is unclear whether yellowstripe scad (YSS) as compared with salmon, both rich in omega-3 fatty acids, have effects on lipid and inflammatory profiles. This study was aimed to compare the effects of YSS and salmon on lipid and inflammatory profiles among healthy overweight adults. **Methods:** A randomized crossover trial with two diet periods was conducted among 50 healthy overweight Malaysian (34% male and 66% female; mean age 29 ± 8 years). Steamed whole YSS fish or salmon fillet was given for eight weeks (3 days per week), retaining approximately 7000 mg EPA+DHA per week. Diets were switched after an 8-week washout period. Fasting blood samples were collected before and after each diet period. Lipid and inflammatory profiles were analyzed. **Results:** VLDL-cholesterol level reduced significantly in salmon group as compared with YSS group (p < 0.05). Triglyceride level decreased significantly after 8 weeks (time effect, p < 0.05). Total cholesterol was slightly higher than baseline in both groups (p > 0.05). HDL- and LDL-cholesterol levels were remained unchanged in YSS group (p > 0.05) but increased slightly in salmon group (p > 0.05). All the inflammatory cytokines (IL-1β, IL-6, TNF-α, and IFN-γ) had slight reduction after 8 weeks in both groups (p > 0.05), with the exception of a slight increase in IFN-γ by salmon diet (p > 0.05). No significant differences were found between fish groups in inflammatory profiles (time x group interaction, p > 0.05). **Conclusions:** Short-term consumption of salmon showed more pronounced effect on VLDL-cholesterol than YSS. Nevertheless, the favorable trend of YSS group on other lipid and inflammatory profiles might deserve further investigation.

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Dietary Daidzein Lowered the Serum Cholesterol Level via Changing the Gene Expression Associated with Cholesterol Metabolism on Female SD Rats

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Keywords: Ovariectomy · Daidzein · Isoflavones · Cholesterol metabolism

Background/Aims: Soy isoflavones usually the daidzein and genistein are the major phytoestrogens found in the soybeans and soy-products. We previously found that daidzein decreased food intake and serum cholesterol level. In this study, we aimed to investigate the serum lipid lowering effects of daidzein and genistein. **Methods:** Daidzein (D, 150 mg/kg diet), genistein (G, 150 mg/kg diet), daidzein:genistein (D+G, 1:1, 300 mg/kg diet) or casein based control AIN 76 cholesterol free diets were fed on six week old non-ovariectomized (non-ovx) and ovariectomized (ovx) Sprague- Dawley rats for 4 weeks. Data were analyzed by three-way ANOVA with Bonferroni post-hoc significance testing. **Results:** The dietary daidzein but not genistein significantly reduced the body weight, food intake, adipose tissue weights and serum and hepatic total cholesterol and triglycerides levels when compared with control group in both Ovx and non-Ovx rats by changing the gene related to lipid metabolism. The mostly affected genes by the daidzein were the transcription of HMGCoAR and CYP7A1. In our study, daidzein significantly suppressed the HMGCoAR mRNA expression (P < 0.005) and hepatic CYP7A1 mRNA expression (P < 0.01). On the other hand, increased the hepatic ACAT-2 (P < 0.05) and LDLR mRNA expression (P < 0.005) in both Ovx and non-Ovx rat. The suppression of CYP7A1 gene expression may be due to compensate reduction of cholesterol biosynthesis. **Conclusions:** This study confirmed that the dietary daidzein is effective component of the soy in lowering the serum and hepatic cholesterol levels by changing the gene expression associated with cholesterol metabolism in liver and small intestine.

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The Effects of Red Guava on ApoB Level and Thickness of Abdominal Aorta Wall in Hypercholesterolemic Rats

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Keywords: Red guava · Hypercholesterolemia · ApoB · Atherosclerosis

Background/Aims: Red guava contains of high fiber and antioxidants. Fiber has been believed to lower cholesterol levels, while antioxidants can inhibit damage to blood vessels. Cholesterol and atherosclerosis are the main factors that trigger the emergence of coronary heart disease (CHD). Someone who has normal cholesterol level can still have a heart attack. Therefore, another early examination like apoB is needed. This study aims to determine the effect of red guava in reducing the risk of CHD through examination of apoB and the thickness of the abdominal aorta wall in hypercholesterolemic rats. **Methods:** The study was conducted on 50 male Sprague Dawley rats of hypercholesterolemic adult males by giving red guava and simvastatin as the cholesterol-lowering drug, were rats fed standard based on AIN93. This research used randomized control group with pre-test post-test design. **Results:** Simvastatin and red guava have significant apoB reductions of 7% and 6%, respectively. Both treatments were not significantly different. Red guava has repaired the damage of the aorta tunica adventitia tissue, as depicted in aortic histonatomy photographs. **Conclusions:** Red guava has the potential to reduce the risk of CHD by lowering apoB levels and repairing damage to the adventitia tissue of the abdominal aorta.

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Lactate Administration Stimulates Fat Oxidation and Liver Glycogen Storage in Resting Rats

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Keywords: Lactate · Fat oxidation · Muscle · PDK4 · Glycogen

Background/Aims: Lactate is known as the end-product of glycolysis, and induces peripheral fatigue. However, since last decades there has been demonstrated positive effect of lactate administration. In this study, we investigated effects of lactate ingestion on energy utilization in rats. **Methods:** 32 Sprague-Dawley rats were divided into control, caffeine (10 mg/kg), lactate (4 g/kg), and caffeine and lactate mixed compound. **Results:** There was no significant difference in oxygen uptake between groups for 6 hr. However, Lac and Caf+Lac significantly increased fat oxidation. MCT1 mRNA in soleus muscle decreased after 2 hr, and FAT/CD36 mRNA in soleus muscle showed up and down tendency with sig-

nificant difference within 2 hr. Finally PDK4 mRNA increased by lactate ingestion. Furthermore glycogen level in liver significantly increased after 2 hr ingestion. These results mean that lactate administration stimulates fat oxidation and liver glycogen storage in resting rats. **Conclusions:** Accordingly, we carefully might suggest that lactate could be an effective supplement for glycogen loading in endurance athletes.

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Buni-Berry (*Antidesma bunius*) Extract Inhibits LDL Oxidation in BALB/c Mice Fed With a High-Fat Diet

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Keywords: Buni-berry extract · High-fat diet · Cardiovascular disease · Oxidized-LDL

Background/Aims: Cardiovascular disease as the leading cause of death in the world is underlined by atherosclerosis caused by LDL oxidation. Consumption of high antioxidants foods is believed can prevent and cease this process. A local fruit that has high antioxidant content is buni-berry (*Antidesma bunius*). The aim of this study was to determine the effectivity of buni-berry extract to prevent oxidation of LDL in BALB/c mice fed with a high-fat diet. **Methods:** Twenty, thirty-weeks old male BALB/c mice were randomly allocated into four intervention groups; buni-berry extract, simvastatin, control-sick and control-normal groups. All groups received high-fat diet (HFD), except the control-normal group which received normal-diet. Treatments were started in all groups at the same time with the administration of the diets. Mice in buni-berry group were treated with oral buni-berry 300 mg/kgBW/day while in simvastatin group were provided with oral simvastatin 6 mg/kkBW/day. The mice in control-sick and control-normal group were not received additional treatment. The intervention was conducted in 12 weeks. Blood samples were examined at baseline and after 12 weeks intervention for oxidised-LDL. **Results:** The increase of Oxidised-LDL concentration was significantly lower in the buni berry extract group (0.25 ng/mL) and simvastatin group (0.30 ng/mL), while in control-sick group was averagely five times higher (2.40 ng/mL), and in control-normal group was 0.15 ng/mL. **Conclusions:** Oral administration of 300 mg/kgBW/day of buni-berry extract for 12 weeks in HFD mice is effectively inhibits oxidation of LDL thus prevent the atherosclerosis process as the basis of cardiovascular diseases.

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Proximate Composition and Glycaemic Indices of Selected Traditional Rice Varieties in Sri Lanka

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Keywords: Traditional rice · Glycaemic index · Raw rice · Nutritional value

Background/Aims: Traditional rice varieties are widely believed to have better nutritional quality and confer many health benefits. This study aimed to determine the proximate composition and glycaemic index (GI) of selected traditional rice varieties. **Methods:** Five traditional rice varieties of which three (Godaheenati, Batapola el and Dik wee) raw red and two (Hangimuththan and Unakolasamba) raw white were milled without parboiling or polishing. The moisture(MC), ash(AC), digestible starch(DS), crude protein and crude fat contents of cooked rice flour were analysed by standard methods. GI was determined by WHO standard method. Glucose standard and 50 g portion calculated based on DS content were given to healthy volunteers. Proximate data are expressed as mean±SD on dry weight basis. Significances were analyzed by SPSS statistical package. **Results:** MC varied from 5.7–9.7% where Godaheenati and Unakolasamba had significantly higher($p < 0.05$) MC indicating higher water retention during cooking. AC were below 1.3%, with raw red rice varieties having higher AC compared to raw white rice. DS, fat and protein contents varied from 76–79%,4–4.3% and 8.6–9.2% respectively with no significant difference among rice varieties. GI of rice varieties varied from 54 ± 5 to 68 ± 8 (mean±SEM) where Batapola el and Hangimuththan were categorized as low GI and others as medium GI. Irrespective of raw red or white no significant difference in GI values was observed and thus indicates that the color of the rice grain has no significant effect on GI. **Conclusions:** Thus these varieties of traditional rice can be recommended for consumption by individuals seeking to control the blood glucose levels.

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Activation of The Nrf2/HO-1 Signaling Pathway Contributes to The Protective Effects of Coptisine Against Oxidative Stress-Induced Apoptosis in HaCaT Keratinocytes

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Keywords: Coptisine · Keratinocytes · ROS · Nrf2/HO-1

Background/Aims: Coptisine, an isoquinoline alkaloid, has a variety of pharmacological effects due to its high antioxidant activity. However, the its protective effect of keratinocytes on oxidative damage has not been studied yet. Therefore, we evaluated the protective effects of coptisine against oxidative damage-mediated apoptosis in human HaCaT keratinocytes. **Methods:** Cytotoxicity was evaluated using the MTT assay. Apoptosis was detected using DAPI staining and flow cytometry analyses. Mitochondrial membrane potential, ROS assay, caspase activity and Western blotting were used to confirm the basis of apoptosis. **Results:** The preincubation of HaCaT cells with coptisine prior to H_2O_2 stimulation resulted in significant inhibition of cytotoxicity and DNA damage associated with the inhibition of ROS accumulation. Cortitin also restored H_2O_2-induced mitochondrial dysfunction and decreased ATP production, and prevented H_2O_2-induced apoptosis. Moreover, the expression of Nrf2 and HO-1 was strikingly promoted by coptisine in the presence of H_2O_2, which was completely abrogated by Nrf2-siRNA. In addition, Nrf2-siRNA transfection significantly eliminated the protective effect of coptisine on H_2O_2-induced cytotoxicity, and this effect was similar by an HO-1 specific inhibitor. Furthermore, the protective effects of coptisine against H_2O_2-induced ROS generation, DNA damage and apoptosis were markedly abolished by ZnPP, indicating that coptisine activates the Nrf2/HO-1 axis in HaCaT cells to protect against oxidative stress. **Conclusions:** Our findings support that coptisine protects keratinocytes against oxidative stress through activation of the Nrf2/HO-1 signaling pathway and may be useful in preventing and treating skin from oxidative damage caused by environmental insults.

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Molecular Mechanism of Physiological Concentration of Luteolin-Induced Nrf2 Activation

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Keywords: Luteolin · Nrf2·phase II drug-metabolizing enzymes · ERK1/2

Background/Aims: A serum concentration of luteolin is reported to reach about 100 nM by dietary habit. However, little is known about the function of luteolin at its physiological concentration. In our previous study, we found that the physiological concentration of luteolin induced Nrf2 activation and antioxidant enzymes in human hepatoma HepG2 cells. However, its underlying molecular mechanism is remained unclear. In this study, we investigated the mechanisms by which the physiological concentration of luteolin induces Nrf2 activation in mice and human hepatoma HepG2 cells. **Methods:** HepG2 cells were treated with luteolin (0.01 nM – 1 μM) for 24 h. U0126 and PD98059 were used as MEK inhibitors. Mice were orally given with luteolin (0.01–10 mg/kg body weight/day) for 7 days. **Results:** Luteolin at 1 nM significantly increased protein expression of antioxidant enzymes NQO1, HO-1 and AKR1B10 in HepG2 cells. To determine whether luteolin activates Nrf2/ARE pathway, electrophoretic mobility shift assay was performed. Luteolin (1 and 100 nM) increased binding of Nrf2 to ARE. Furthermore, luteolin increased phosphorylation of Nrf2, and MEK inhibitors repressed lutelin-induced phosphorylation and activity of Nrf2. In vivo results showed that 0.1–10 mg/kg luteolin increased expression of NQO1 and HO-1, and nuclear accumulation of Nrf2 in the liver. Physiological concentration of luteolin increased antioxidant enzymes through the ERK1/2-medi-

ated Nrf2/ARE pathway. **Conclusions:** Luteolin-induced phase II drug metabolizing enzymes may contribute to prevention of many diseases through suppression of oxidative stress and xenobiotics-related toxicity in the liver. This work was supported by JSPS KA-KENHI 17H0818.

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The Effect of The Japanese Diet Intake on The Overweight Subjects

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Keywords: Japanese diet · Anti-obesity · CRP
Background/Aims: In our previous study, we compared Japanese diets (JD) from different years, and established clearly, using mice, that the 1975 type JD is the most beneficial to health. We also demonstrated that the consumption of diets with the characteristics of the 1975 JD reduced the amount of abdominal fat in those with a normal weight. In this study, we investigated if the 1975 JD could reduce the amount of abdominal fat in overweight people too. **Methods:** Using a single-blind randomized controlled trial, we compared the modern diet (MD) with the 1975 type JD which is based on the MD, but includes five characteristics of the 1975 JD in an enhanced form. Overweight people aged 20–70 years were randomly assigned to an MD group (n = 30) and a JD group (n = 30). The participants consumed a test diet that was provided three times a day for 28 days. We measured their BMI, etc., conducted a biochemical examination of their blood before and after the test diet, and compared the proportions of change. **Results:** After the consumption of the test diet, those in the JD group had significantly decreased weight, BMI, waist circumference, and levels of total cholesterol, LDL cholesterol, glycated hemoglobin and CRP levels, and significantly increased HDL cholesterol levels, hematocrit values and magnesium levels than those in the MD group. **Conclusions:** Therefore, diets with the characteristics of the 1975 JD may have beneficial effects on the lipid metabolism of overweight people and reduce the onset risk of metabolism-related disorders, such as obesity and diabetes.

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Potential Benefits of Fermented Rice Bran Supplementation on Muscle Atrophy in Streptozotocin-Induced Diabetic Rat

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Keywords: Fermented rice bran · Muscle atrophy · Diabetes mellitus · STZ-induced diabetic rat model
Background/Aims: Muscle atrophy is a consequence of aging and various diseases including diabetes mellitus. It is caused by the imbalance of muscle proteolysis and synthesis which is triggered by inflammation and oxidative stress. Fermented rice bran (FRB) that was prepared by dual fermentation of lactic acid bacteria and fungi could prevent ulcerative colitis and alleviate metabolic syndrome in rat models. However, nutraceutical effect of FRB on muscle atrophy has never been investigated regarding diabetic condition. In this study we evaluated the effect of one-month FRB supplementation on Streptozotocin (STZ)-induced diabetic rat. **Methods:** Eight-week-old Sprague Dawley (SD) rats were divided into three groups. Two of the three groups were injected with STZ (40 mg/kg bw) as diabetic group and one group was injected with vehicle (0.05 M citrate buffer, pH 4.5) as normal group. One of the diabetic groups (control group) and the normal group were fed with AIN93M diet and another diabetic group (FRB group) was fed with 10% of FRB based on AIN93M diet. **Results:** Diabetic groups had some decreases on body weight, muscle size, and blood profile condition compared with normal group (p < 0.01), and these changes were mitigated in FRB group. The comparison in diabetic groups showed that FRB group had higher body weight (p < 0.05), weight gain, plasma insulin level, and lower blood glucose level. Furthermore, FRB group had larger muscle cross-sectional area (p < 0.05) and lower expression on protein degradation marker compared with control group. **Conclusions:** FRB supplementation could be beneficial on ameliorating the muscle atrophy in diabetic condition.

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Turmeric Protects Bisphenol-A Induced Genotoxicity in Rats

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Keywords: Bisphenol-A · Turmeric·Comet assay · Rodent bone marrow micronucleus test
Background/Aims: In this study, we investigated the protective role of turmeric, on the in vivo genotoxic effects of Bisphenol-A exposure in Wistar rats. Bisphenol-A is a known endocrine disrup-

tor and suspected carcinogen, that may find way to diet through plastics used for food-packaging. **Methods:** Rats were divided into three groups of twelve animals each and were administered with Bisphenol-A by oral gavage at 0, 50 and 100 μg. Half of the animals in each group were fed with diets containing 3% turmeric (wt/wt), for a period of 4 weeks while rest of the animals received the same diet without turmeric. At the end of the experiment, all the animals were sacrificed and liver, kidney, femurs were collected and analyzed. Mean and SD values were compared by one-way ANOVA and Kruskal-wallis-wilcoxon test, the incidence of micronuclei was compared using the Mann-Whitney U-test. **Results:** Significant decrease in the serum malondialdehyde and urinary 8-hydroxy-2'-deoxyguanosine levels were seen in 50 & 100 μg of Bisphenol-A+turmeric groups compared to 50 & 100 μg of Bisphenol-A groups respectively. 50 & 100 μg Bisphenol-A groups exhibited significantly higher mean levels of DNA damage in liver and kidney compared to the control group. Significant decrease in DNA migration in response to 50 μg Bisphenol-A+turmeric fed groups was observed in liver and kidney. 50 & 100 μg Bisphenol-A treated group showed a significant increase in the formation of micronuclei which was approximately 3-fold higher compared to the control group. **Conclusions:** Turmeric feeding significantly inhibited the micronuclei formation. The study results indicate that turmeric can protect against Bisphenol-A induced genotoxicity in rats.

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Vitamin K2 Attenuates The Lipopolysaccharide-Induced Inflammation in Mouse Microglial Cells

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Keywords: Menaquinone-4 · Microglia·Neuroinflammation · NFκB

Background/Aims: The microglial inflammation has been suggested as the potential cause of neuroinflammation which subsequently induces neurodegenerative diseases including Alzheimer's and Parkinson's. Microglia is the brain-resident macrophage-like cells which trigger an inflammatory reaction when over-activated. On the other hand, increasing evidence revealed that menaquinone-4 (MK-4), a subtype of vitamin K2, ameliorates inflammation in the peripheral system. MK-4 was also found highly within the brain despite its role has not been well elucidated. In this study, we investigated whether MK-4 could manage the inflammation in the stimulated mouse-derived microglial cells. **Methods:** MG6 mouse microglial cells were exposed with lipopolysaccharide (LPS) either with or without pre-treatment of MK-4. The mRNA levels of pro-inflammatory cytokines were measured using qRT-PCR. Furtherly, we analyzed the phosphorylation of NFκB p65 subunit using western blot and evaluated its nuclear translocation under a fluorescence microscope. In addition, the inflammasome inhibitory effect by MK-4 administration was also evaluated. **Results:** We found that MK-4 dose-dependently suppressed LPS-induced mRNA levels of Il-1β, Tnf-α, and Il-6. MK-4 significantly reduced the phosphorylation of NFκB p65 subunit possibly through the inhibition of its nuclear localization. **Conclusions:** These results suggest that MK-4 effectively inhibits the microglial inflammation via the inhibition of the NFκB signaling. Additionally, our data provide a novel information regarding the potential role of MK-4 in the brain as an anti-inflammatory substance.

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Potency of Black Rice Bran to Inhibit The Development of Colorectal Cancer on BALC/c Mice

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Keywords: BALB/c mice · Black rice bran · Colorectal cancer · Short chain fatty acid

Background/Aims: Among all cancer cases in the world, colorectal cancer is the third most common diagnosed after lung and breast. The greatest factors causing this disease are less consumption of dietary fiber and bioactive compound. One of product that rich of it is black rice bran. The aim of this study was to see the effect of black rice bran intervention to male BALB/c mice diet to inhibit colorectal cancer development. **Methods:** In this study, mice was divided into three groups, there are normal group (C-), carcinogen induced group (C+), and carcinogen induced group that was fed by black rice bran modified feed (BRB). Azoxymethane and dextran sodium sulfate were used as carcinogen. Evaluation of colorectal cancer development on BALB/c was done by analyses of short chain fatty acid especially butyric acid, lactic acid bacteria (LAB) total, β-glucuronide enzyme activity in cecum, spread of nodule, and histopathology in colon tissue. All mice were terminated on 16 weeks after induced by carcinogen. Data was obtained by analyses of variance ($p < 0.05$) and showed significantly different in all groups. **Results:** Butyric acid concentration and LAB total of BRB was higher than C+ (15.43 ± 0.28 vs 6.69 ± 2.03 mmol) and (8.26 ± 0.18 vs 7.10 ± 0.01 log CFU/g), while β-glucuronide enzyme activity of BRB was lower than C+ (222.85 ± 17.05 vs 360.29 ± 74.19 nmol phenolphthalein/cecum/minute). The histopathology of colon tissue showed that carcinogenesis development on BRB was slower than C+ also it was figured on spread of nodule (1.65 ± 0.71 vs 5.73 ± 2.93 nodules/cm^2). **Conclusions:** That result showed black rice bran could inhibit colorectal carcinogenesis development.

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Effects of High-Fat-Diet on Hypothalamic Kisspeptin/GPR54 Signaling Pathway of Growing Rats

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Keywords: Kisspeptin · GPR54 · Testosterone · High-fat-diet

Background/Aims: Hypothalamic Kisspeptin/GPR54 system is the "control switch" for the onset of puberty. It was reported that obese adolescents have the characters of precocious puberty, but the mechanism is still unknown. To observe the effect of high-fat diet on the hypothalamic expressions of KiSS-1, the G-protein coupled receptor 54 (GPR54) and GnRH mRNA and the level of testicular testosterone of male growing rats. **Methods:** Male weaning rats (21std) were randomly assigned to chow diet sedentary (CS, n = 24) and high-fat diet sedentary (HS, n = 24) groups. 6 rats of each group were killed on the 35th day, 42nd day and 56th day. The hypothalamic expression of KiSS-1, GPR54 and GnRH mRNA and the level of testicular testosterone were tested in each group. **Results:** During the growth period, the Kiss-1mRNA of HFS group increased continusly, which was opposited with CS group. The GPR54 mRNA of HFS group got to the maximum level on 42th day, which was similar with CS group. Both in CS and HFS groups, GnRH mRNA decreased significantly before 56th day, which had the trend of increse. The testicular testosterone of HFS group got to the maxium on 35th day, which was increased continusly in CS group. **Conclusions:** The high-fat diet enhanced the change trend of hypothalamic kisspeptin/GPR54 signaling pathway during the growth period, which were out-of-step with testicular testosterone of rats.

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Vitamin D Concentration Is Associated with Diabetes Peripheral Neuropathy in Elderly But Not the Youth and Middle-Aged Patients

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Keywords: Diabetic peripheral neuropathy · Vitamin D · Type 2 diabetes · Age

Background/Aims: The relationship between vitamin D and Diabetes Peripheral Neuropathy (DPN) is not consistent in epidemiologic studies. This study aimed to investigate the relationship between vitamin D and DPN in different age groups. **Methods:** In this cross-sectional study, the 1461 patients admitted to the Department of Endocrinology in Xin Hua Hospital from June, 2016 to September, 2017 were divided into three age groups, including the Youth group(24–44 y, n = 127), the Middle-aged group(45–64 y, n = 779) and the Elderly group(≥65 y, n = 555). Basic information and laboratory results were collected from the medical records. **Results:** 32.7% (478/1,461) of the patients were found with DPN, with 12.6% in the youth group, 33.6% in the Middle-aged group and 36.0% in the Elderly group, respectively. The serum 25-OH Vitamin D concentration in DPN patients was lower than non-DPN patients in total sample and the Elderly group (P < 0.05). The results of multivariate logistic regression indicated that low vitamin D concentration was a risk factor for DPN in the Elderly group (P < 0.05) but such relationship was not found in the Youth or the Middle-aged group. Receiver operating characteristic analysis revealed that serum 25(OH) D < 34.8 nmol/L predicted the occurrence of DPN in the elderly patients(P < 0.001). **Conclusions:** Lower vitamin D level was firstly found to be associated with DPN in diabetic patients over 65 years of age, which might be used as a potential predictor of DPN in this population. The interaction between vitamin D and age in the development of DPN and its underlying mechanisms need to be further explored.

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Capsaicinoid Extracted From White Chili Pepper Regulates Energy Homeostatis Related Genes in Obese Mice

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Keywords: Leptin · Energy homeostatis · Anti-obesity effect · Capsaicinoids · White chili pepper · *Capsicum frutescens*· Obese mice

Background/Aims: Obesity has become a critical health problem worldwide because of the accumulation of excess body fat that may results in health complications. Dieting and drugs consumption as obesity treatment has low rate of success and side effects in long term usage, therefore natural compounds are being studied for developing new drugs. Chili pepper (*Capsicum frutescens*) has high capsaicin (70%) that may affect the energy homeostatis by decreasing appetite and increasing energy expenditure which result the weight loss by modulate leptin pathway related genes. The objective in this research is to analyze capsaicinoid fraction (CF) as an expression modulator of energy homeostatis related genes (LepR, POMC, Sim1, and SH2B) in obese mice. **Methods:** CF was extracted with absolute ethanol using soxhlet, then quantified using HPLC. Obesity modeling was done by high fat diet to increase total cholesterol and body weight (BW), then obese mice was treated with CF (10 and 25 mg/kg BW) and orlistat (5 mg/kg BW) for 4 weeks. Expression of leptin related genes in adipose tissue and hypothalamus of obese mice was analyzed using qRT-PCR. **Results:** According to HPLC profile, capsaicin content in white chili pepper was 45139.58 μg/g. CF at 25 mg/kg BW exerted anti-obesity activity through the decrease of triglyceride level by upregulating LEPR, POMC, SIM1, and SH2B1 gene expression in adipose tissue and hypothalamus of obese mice. **Conclusions:** These results suggest that CF may possess anti-obesity effect by modulating energy homeostatis related genes at molecular level in obese mice.

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Vitamin D Attenuates Foxol-Target Muscle Atrophy Gene Expression

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Keywords: Skeletal muscle · Atrophy · Vitamin D
Background/Aims: Skeletal muscle is the largest organ in the human body and it plays important roles in exercise, energy expenditure, and glucose/amino acid metabolism. Various conditions, such as bedrest, aging, certain diseases, and glucocorticoid treatment, cause muscle atrophy, thereby decreasing quality of life. FOXO1 is a forkhead-type transcription factor that antagonizes insulin-mediated anabolic signals. We previously found that FOXO1 gene expression was induced in various muscle atrophy conditions and that it caused muscle atrophy by upregulating atrophy-related genes, including atrogin-1 (ubiquitin ligase) and cathepsin L (lysosomal proteinase). These findings indicate that FOXO1 in skeletal muscle plays an important role in muscle atrophy. Thus, identifying compounds that suppress FOXO1 transcriptional activity could be useful in preventing muscle atrophy. **Methods:** In the present study, we used a GAL-FOXO1 reporter system to search food components/agents that suppress FOXO1 transcriptional activity. We screened 520 commercially available food components and found 1,25(OH)2 vitamin D3 that suppressed FOXO1 transcriptional activity most strongly. Moreover, vitamin D suppressed glucocorticoid-induced gene expression of atrogin-1 and cathepsin L in C2C12 myoblasts. **Results:** Based on the data in this study, 1,25(OH)2 vitamin D3 appears to suppress FOXO1 transcriptional activity and its target atrophy-related gene expression. Vitamin D is known to be a promising agent in preventing aging atrophy (sarcopenia), but its molecular mechanism remains unclear. This study may shed light on the mechanism of preventing sarcopenia by oral vitamin D supplementation.

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The Anti-Tumor Potential of Cinnamaldehyde on Gynecology Cancer: Mechanism and Actions

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Keywords: Visfatin · Cinnamaldehyde · Gynecology cancer
Background/Aims: Excessive growth and metastasis of cancer cells is the main cause of cancer death, and how to inhibit cancer growth and metastasis is an important research topic. Among them, the issue of obesity has been confirmed in many studies to be related to the incidence and prognosis of cancer. Obesity causes adipocytes to secrete more fat hormones. Recently, the newly discovered fatty hormone Nicotinamide phosphoribosyl transferase (NAMPT, visfatin) has insulin-like functions. It has also been confirmed in related studies as a major cause of cancer proliferation and metastasis. Cinnamaldehyde is one of the active ingredients derived from cinnamon and has been used as a natural flavor and fragrance in the kitchen and industry. And has a significant anti-cancer effect in vitro and in vivo study. **Methods:** For MDAMB231 cancer cell lines used different dosage of cinnamaldehyde combined with FK866 (visfatin inhibitor) to test the cell toxicity, cell cycle, the inhibition of tumor invasion and metastasis and related molecular mechanism. **Results:** The administration of different concentrations of cinnamaldehyde(75 μM) and FK866 (100 nM) to human breast cancer observed the inhibition of cancer cell growth and metastasis and significantly decrease extracellular and intracellular visfatin. Furthermore improved related mechanism of apoptosis and migration. **Conclusions:** Cinnamaldehyde has a significant effect on inhibit visfatin induced cancer proliferation and migration.

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Effect of Liquiritigenin on Apoptotic Beta-Cell Death by Palmitate-Induced Lipotoxicity in INS-1 Cells

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Keywords: Liquiritigenin · Beta-cell · Apoptosis · ER stress
Background/Aims: Liquiritigenin (LQ), a flavonoid isolated from Glycyrrhiza uralensis, is an estrogenic compound which acts as an agonist for the estrogen receptor β. In this study, we investigated protective effect of LQ on palmitate (PA)-induced apoptosis in INS-1 cells. **Methods:** To examine effect of LQ on beta cells, glucose stimulated insulin secretion (GSIS) by enzyme immunoassay (EIA) method and cell viability by MTT were measured in rat beta-cell line INS-1 cells. Expression level of apoptotic proteins and endoplasmic reticulum (ER) stress markers were analyzed by western blot analysis after LQ treatment. Tunicamycin and thapsigargin were used to ER stress inducer and AKT inhibitor (AKTi-1/2) was used to inhibit LQ-induced AKT phosphorylation at ser 473. **Results:** Exposure of INS-1 cells to 5 μM of LQ significantly increased GSIS as well as cell viability. PA treatment increased annexin-V stained cells and apoptotic proteins such as cleaved caspase-3, cleaved poly (ADP-ribose) polymerase and bax, but these increases were significantly inhibited by LQ treatment. LQ treatment inhibited cell death by ER stress inducers and PA induced ER stress marker proteins such as CHOP and phosphorylated forms of PERK and eIF2α was also significantly downregulated in LQ treated cells. LQ phosphorylated AKT at ser 473 and blocking AKT signaling inhibited LQ induced decrease in level of phosphorylated PERK, consequently cell viability was not recovered. **Conclusions:** Our data demonstrated that LQ has anti-apoptotic effect against PA induced lipotoxicity and AKT mediated ER stress inhibition was involved in the anti-apoptotic effect of LQ.

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Lycium barbarum Polysaccharides and C-Phycocyanin Protect Against Ethanol-Induced Gastric Ulcer in Rats by Anti-Inflammation and Cytoprotection

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Keywords: Ethanol · Gastric ulcer · *Lycium barbarum* polysaccharides · C-phycocyanin

Background/Aims: Gastric ulcer is a common complication of gastrointestinal disease. *Lycium barbarum* polysaccharides (LBPs) extracted from wolfberry fruit and C-phycoyanin (C-PC), a pigment-protein complex from spirulina, have been considered to have antioxidant and anti-inflammatory properties. This study investigated the gastroprotective effect of Lycium barbarum polysaccharides and C-phycoyanin on gastric ulcer induced by ethanol in rats. **Methods:** Sprague-Dawley rats were divided to 5 groups: normal, ulcer, ulcer treated with 100 mg/kg LBPs, ulcer treated with 50 mg/kg C-PC, and ulcer treated with a combination of 50 mg/kg LBPs and 25 mg/kg C-PC. The treatment were given by gavage from week 1 to week 5, and gastric ulcer was induced by 50% ethanol every other day from week 2 to week 5. Gastric lesion was detected by H&E stain, and gastric tumor necrosis factor-alpha (TNF-α), interleukin-6 (IL-6), and non-protein sulfhydryl group (NP-SH) levels were measured. **Results:** Pretreatment with LBPs or C-PC attenuated the severity of ethanol-induced gastric mucosal damage. Administration of LBPs and C-PC significantly decreased proinflammatory cytokines TNF-α and IL-6 and increased gastroprotective factor NP-SH levels in gastric tissue. **Conclusions:** Our study suggested that administration of LBPs and C-PC reduced ethanol-induced gastric injury in rats through suppression of gastric inflammation and elevation of gastroprotective substance.

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Lycium barbarum Polysaccharides and C-Phycocyanin Exert Anti-Inflammatory Effects on Aspirin-Induced Gastric Epithelial Injury by Suppressing Extracellular Signal-Regulated Kinase Activation

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Keywords: *Lycium barbarum* polysaccharides · C-phycocyanin · Aspirin · Extracellular signal-regulated kinase

Background/Aims: Aspirin, a non-steroidal anti-inflammatory drug, is widely used for cardio-protection, and causes gastrotoxicity by impairing the epithelial defense through cyclooxygenase inhibition. *Lycium barbarum* polysaccharides (LBPs) extracted from wolfberry act as an antioxidant, and the dried fruit of wolfberry has been used for traditional medicinal herb and food supplement. C-phycocyanin (C-PC) is a biliprotein pigment of the blue-green alga *Spirulina platensis*, and possesses antioxidant and anti-inflammatory properties. This study investigated the effects of LBPs and C-PC on aspirin-induced gastric damage in rat gastric mucosal RGM-1 cells. **Methods:** RGM-1 cells were pretreated with different concentrations of LBPs and/or C-PC (100, 250, and 500 μg/mL) for 24 hours, and gastric damage was induced by 21 mM aspirin for 3 hours. Cell viability was measured by MTS cell proliferation colorimetric assay. Protein expression of phosphorylated extracellular signal-regulated kinase (p-ERK) and ERK were determined by sodium dodecyl sulfate polyacrylamide gel electrophoresis and Western blotting. **Results:** Aspirin treatment significantly decreased cell viability of RGM-1 cells, but LBPs or C-PC had no effects on cell viability compared with the control group without any treatment. Aspirin increased the ratio of p-ERK/ERK indicating that ERK signaling pathway was activated by aspirin, while LBPs and/or C-PC decreased the ratio of p-ERK/ERK compared with aspirin treatment alone. **Conclusions:** LBPs and/or C-PC could exert an anti-inflammatory effect on aspirin-induced gastric epithelial damage in RGM-1 cells by suppressing the activation of ERK signaling pathway.

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Mechanism of Increased Expression of VLDLR and Relationship between Fatty Liver By Protein Deficiency

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Keywords: VLDLR · Fatty liver · Protein deficiency

Background/Aims: We have found that hepatic very low-density lipoprotein receptor (VLDLR) expression was markedly increased in rats fed low protein diet, which may contribute to steatosis caused by protein deficiency. The aim of this study is to determine the types of hepatic cells to express VLDLR and investigate relationship between liver lipid contents and VLDLR expression. **Methods:** Parenchymal cells (PC) and non-parenchymal cells (NPC) were prepared from rat liver by collagenase perfusion procedure and VLDLR mRNA was measured. Effect of dietary protein content (20, 5, 3, 1%) and effect of period (1, 2, 3, 7 days) fed low protein diet (5% protein) on hepatic VLDLR mRNA were examined with mice and rats, respectively. Effect of feeding ketogenic diet (KD) for 4 weeks on hepatic VLDLR mRNA was also examined in rats. VLDLR was expressed in both PC and NPC in the liver. **Results:** Liver triglyceride (TG) content and VLDLR mRNA level were positively correlated in mice fed various amount of protein. Liver TG content was increased in rats fed low protein diet for 1 day while VLDLR mRNA was increased after 3 days. Liver TG level increased markedly in rats fed KD, but VLDLR mRNA level was not influenced. VLDLR is expressed in both PC and NPC which may have different roles in protein malnutrition. **Conclusions:** Increased expression of hepatic VLDLR is not a major cause for fatty liver in protein deficiency, but is related to the degree of lipid accumulation.

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The Protective Effects of γ-Tocotrienol on The Pancreas Under Lipotoxic Stress

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Keywords: Pancreas · β cell · Diabetes · Vitamin E

Background/Aims: Vitamin E is a fat-soluble, antioxidative vitamin, with eight homologs (α, β, γ, δ-tocopherol and tocotrienol). Notably, tocotrienols have been found to have physiological effects beyond those of the antioxidant nature, including effects against diabetes. For the prevention and treatment of diabetes, it is critical to inhibit or reverse the exhaustion of β cells that is known to occur under stress from either high glucose or lipid intake. In this study, we focused on the homolog γ-tocotrienol, and assessed its protective effects on the pancreas under lipotoxic stress. **Methods:** Eighteen C57BL/6J mice were divided into three groups and fed a high-fat diet without vitamin E (HF), or HF supplemented with either 0.1% α-tocopherol or γ-tocotrienol. Oral glucose tolerance and insulin tolerance were tested. The significance of differences was determined by one-way analysis of variance and Fischer's least significant difference test. **Results:** Supplementation of γ-tocotrienol resulted in a significant improvement in glucose and insulin tolerance compared to the supplementation of its more popular isoform, α-tocopherol (P < 0.05). Insulin secretion following glucose loading was significantly higher in the γ-tocotrienol group compared to the other groups (P < 0.05). There was also an increase in the number of smaller islets in the pancreas as compared to the other groups. **Conclusions:** Our results indicate that the anti-diabetic effects of γ-tocotrienol may derive from its protective role against lipotoxicity in pancreatic β cells, rather than in improving peripheral glucose tolerance. We will look at the mechanisms closely in vitro.

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Safety and Efficacy Assessments of Isoflavones From Pueraria (Kudzu) Flower Extract in Ovariectomised Mice: A Comparison with Soy Isoflavones

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Keywords: Safety and efficacy assessments · Isoflavones · Pueraria flower · Estrogenic effects · CYP

Background/Aims: Numerous foods with function claim are available in Japanese market containing isoflavones derived from pueraria flower extract (PFE). These products are labeled with function claims reducing visceral fat. However, these foods have not undergone proper safety assessment such as estrogenic activity and the effects on drug metabolizing enzymes (cytochrome P-450: CYP) in liver. Therefore, this study evaluated the safety and efficacy of PFE compared with soy isoflavones (ISO) in ovariectomised (OVX) mice. **Methods:** OVX mice were randomly divided into five groups: OVX control, OVX fed a PFE diet (PFE in human intake), OVX fed a 20PFE diet (PFE in 20-fold human intake), OVX fed an ISO diet (ISO in human intake), and OVX fed a 20ISO diet (ISO in 20-fold human intake). Each group was fed the diet for 28 days. **Results:** Body, liver, and visceral fat weights were not affected by PFE, 20PFE, ISO, or 20ISO diet in the mice. CYP1A and CYP3A activity and CYP3A11 and CYP3A41 mRNA expression in the liver of the 20ISO-fed mouse were significantly higher than those of the control mice. The ovariectomy-induced bone loss was inhibited by 20ISO diet, but not by PFE diet in OVX mice. **Conclusions:** These results suggest that (1) PFE intake in human doses had no estrogenic property and did not affect CYP activity in the liver; (2) there was no evidence that PFE affects visceral fat weight in OVX mice.

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FADS2 Inhibition in Essential Fatty Acid Deficiency Induces Hepatic Triglyceride Accumulation by Impairment of Lipoprotein Secretion

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Keywords: Fatty acid · Mead acid · Phosphatidylcholine · Fatty liver

Background/Aims: Fatty acid desaturase 2 (FADS2) is responsible for the first desaturation reaction in the synthesis of polyunsaturated fatty acids (PUFAs) such as arachidonic acid (20:4n-6) and is involved in Mead acid (20:3n-9) production during essential fatty acid deficiency (EFAD). Although PUFAs such as arachidonic acid are known to provide the fluidity on biological membranes,

the significance of Mead acid in an EFAD state is not well understood. This study examined the effect of Mead acid synthesis inhibition in the EFAD state via FADS2 inhibitor on hepatic lipid accumulation. **Methods:** The mice were fed diet containing 7% soybean oil (the control group) or EFA-deficient diet containing 7% tripalmitin (the EFAD group) for 5 weeks. The EFAD+SC group was fed the EFAD diet supplemented with the FADS2 inhibitor SC26196 for the latter 3 weeks of during experimental 5 weeks. Hepatic triglyceride accumulation was observed in the EFAD+SC group compared with other groups. **Results:** FADS2 inhibition in the EFAD state reduced triglyceride concentration in VLDL and markedly diminished Mead acid in phosphatidylcholine (PC) in the liver and plasma. Furthermore, the amount of C20PUFAs in hepatic and plasma PC dramatically reduced in the EFAD+SC group, whereas the decrease of C20PUFA levels of PC in the EFAD group was modest because of the increased Mead acid in PC. **Conclusions:** These results supposed that Mead acid in PC was important as a component of VLDL. Mead acid might play the role of a substitute of PUFAs in VLDL secretion during EFAD.

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The Association of Vitamin D Level with Lipid Profile in Chinese Children: A Prospective Cohort Study

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Keywords: Vitamin D · Lipid profile · Children

Background/Aims: Lipid metabolism plays an important role in human cardiometabolic diseases, whether it is related to vitamin D levels in children is still inconsistent. Thus, the aim of the present study is to determine the association between 25-hydroxyvitamin D (25(OH)D) level and lipid profile. **Methods:** A prospective cohort study was conducted among children aged 7–10 years in South China (baseline n = 612, follow up nine months n = 584). Anthropometric and demographic characters, diet and serum lipids profile including triglyceride (TG), total cholesterol, high-density lipoprotein cholesterol (HDL-C) and low-density lipoprotein cholesterol were collected or measured at both baseline and end of the follow-up. Serum levels of 25(OH)D were measured at baseline and were classified into various categories for analysis. Associations between 25(OH)D level and lipids profile were analyzed by multiple linear regression. **Results:** After nine-months follow-up, the baseline 25(OH)D level was found to inversely associate with TG levels and positively associate with HDL-C levels (b = –0.015 and 0.010, P for trend = 0.011 and 0.012, respectively), with the adjustment for age, gender, BMI, diet, time for outdoor activities, and parental education, which means for every 1 nmol/L increase in 25(OH)D concentration at baseline, there is a 0.015 nmol/L decrease in TG and 0.010 increase in HDL-C at 9 months later. **Conclusion:** 25(OH)D level was inversely associated with TG level and positively associated with HDL-C level in Chinese children, which indicates that vitaminD is related to lipid profile, but its association with lipid related cardiovascular disorders and diseases need to be further investigated in childhood.

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The Effect of Coconut Water on Adipocyte Differentiation and Lipid Accumulation in 3T3-L1 Cells

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Keywords: Coconut water · Preadipocyte · Adipocyte · Differentiation · Lipid accumulation

Background/Aims: Coconut water has been found to have lipid-lowering effects in animal studies. However, lack of published reports is available regarding its effect on adipocytes. Therefore, this study was conducted to observe the effect of coconut water on adipocyte differentiation and lipid accumulation in 3T3-L1 cells. **Methods:** The sample used was mature coconut water from tall variety, which is available abundantly due to utilization of the kernel to produce coconut milk and coconut oil. Based on the results of a preliminary study, the sample was heat-treated and added with certain amino acids as precursors for Maillard reaction to improve its inferior flavor. As a comparison, aromatic coconut water was also included in the study since it is highly preferred as fresh beverage. A total of six coconut water samples were supplemented to 3T3-L1 cells, which were analyzed for cell proliferation, lipid accumulation, triglyceride content, and gene expression. Arginine, total phenolic, and vitamin C contents of the samples were also determined. Data were analyzed with ANOVA followed by Tukey's test. **Results:** Both mature coconut water and aromatic coconut water could slightly suppress lipid accumulation, with mature sample had significantly lower percentage of accumulation compared to control sample (p < 0.05). Meanwhile, canned samples had no significant difference with the fresh ones in terms of lipid-lowering activity (p > 0.05). Similarly, addition of amino acid, such as lysine and proline in canned samples also did not significantly affected differentiation of the cells. There was no significant effect from the samples on expression of C/EBP-α and PPARγ, indicating possibility of other pathways in the hypolipidemic effect of coconut water. **Conclusion:** Coconut water might have potential to inhibit adipogenesis in 3T3-L1 cells due to its bioactive compounds.

Poster Presentation

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Anti-Inflammatory Effect of Tryptophan Metabolites in Fermented Rice Bran

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Keywords: Rice bran · Fermentation · Inflammation · Aryl hydrocarbon receptor

Background: Rice bran which has been fermented by *Aspergillus kawachii* and a mixture of lactic acid bacteria (FRB) was found to be able to alleviate dextran sodium sulfate-induced inflammation in mice intestine1). However, it is still unknown which of FRB's bioactive compounds are responsible for this anti-inflammatory effect. This research aims to uncover this bioactive compound and its mechanism of action by using macrophage as a miniature model. **Methods:** RAW 264.7 cells were used in this experiment. Cells were incubated with FRB, its fractions, or tryptophan metabolites and followed by lipopolysaccharide treatment. Macrophages were then harvested and analyzed with qRT-PCR or Western blot. Tryptophan and its microbial metabolites in FRB and non-fermented rice bran were also measured using fluorescent HPLC. **Result:** FRB treatment was found to be able to regulate NFκB pathway and decrease the level of Il-6 mRNA. The same treatment also increased the level of Il-10 mRNA. Since both these cytokines were known to be regulated by the aryl hydrocarbon receptor (AHR), we analyzed the amount of AHR ligands in FRB and RB. Tryptophan microbial metabolites such as tryptamine, indole-3-acetic acid and indole were known to be able to act as AHR ligands. Fermentation was found to change the level of these compounds in rice bran. **Conclusion:** We hypothesized that tryptophan microbial metabolites might play some roles in FRB anti-inflammatory effect. Further research needs to be done in order to fully understand the mechanism behind this effect.

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Analysis of Beta Carotene Level in Indonesian Local Fruits and Vegetables

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Keywords: Beta-carotene · Spectrophotometry · Vitamin A precursor · Antioxidant

Background: Beta-carotene is one of the natural dyes which functions as an antioxidant and is a precursor of vitamin A. This study was aimed to analyze the beta-carotene level in local Indonesian vegetables and fruits. **Methods:** This was an experimental study with several local Indonesian vegetables and fruits. The vegetables which were investigated in this study: carrot, pumpkin, red spinach, purple eggplant, red beet, curly red chili, tomato, potato, and green spinach. Furthermore, the local fruits which were explored including pineapple, papaya, melon, *barangan* variety banana, red guava, *Medan* variety orange, dragonfruit, and local lemon. The UV-VIS spectrophotometry with 517 nm wavelength was used to analyze beta-carotene. **Results:** This study showed that curly red chilly contains with the highest level of beta-carotene (154.36 ppm) amongst other local vegetables whereas pineapple has the highest level of beta-carotene (12.366 ppm) amongst local fruit group. **Conclusion:** Beta-carotene level vary between fruits and vegetables. Further analysis should be undertaken to explore the beta-carotene level in other local food ingredients with the highest beta-carotene level. Moreover, the findings may encourage people to increase the level of vegetables and fruits consumption.

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Correlation between Leptin Adiponectin Ratio and HOMA-IR in Indonesian Obese Children

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Keywords: Adiponectin · Leptin · L:A ratio · HOMA-IR

Background: Overweight and obese children are likely to stay obese into adulthood and more likely to develop noncommunicable diseases like diabetes and cardiovascular diseases at a younger age. Many markers have been studied but the most used are leptin and adiponectin. Data on these markers are scare in Indonesia. This study aims to assess the association between leptin-adiponectin ratio (LAR) with HOMA-IR in Indonesian obese children. **Methods:** This was a cross -sectional study that included 80 school aged children in Indonesia during January to July 2014. Blood was drawn to determine leptin, adiponectin level, fasting blood glucose, insulin and Homeostasis Model for Assessment of Insulin Resistance (HOMA-IR). To assess correlations we used Spearman's analyses and association of the studied variables with HOMA-IR were done using linear regression analysis. **Results:** The leptin to adiponectin ratio was significantly and positively correlated with the body mass index (r = 0.6865 p < 0.0001), waist circumference (r = 0413, p < 0.0001), WHtR (r = 0.524, p = 0.001), insulin levels (r = 0.430, p < 0.0001) and HOMA -IR (r = 0.306, p < 0.006). When L/A ratio as the dependent variable, BMI, WC, leptin, adiponectin, and fasting glucose were the significance determinants (R^2 = 0.917). **Conclusion:** This study revealed positive correlation between L:A ratio with HOMA-IR and also with both BMI and waist circumference

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Anemia, Nutritional Status, and Dietary Patterns in Adolescent Girls of Vocational High School Students in Bekasi, Indonesia

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Keywords: Anemia · Adolescent girl · Vocational school · Dietary pattern

Background: Anemia is a nutritional problem that occurs in adolescent girls like vocational students. Based on the results of the 2013 National Basic Health Survey, anemia in Indonesia was 21.7% with 23.9% for women and 18.4% of aged 15–24 years. There is not much data available for anemia in adolescent girls. This study aimed to determine the incidence of anemia, nutritional status and dietary pattern in adolescent girls of vocational school students in Bekasi, Indonesia. **Methods:** This study used a cross sectional design. Samples are 345 adolescent girls, students of vocational schools in Bekasi, Indonesia. Anemia was determined based on blood hemoglobin levels (<12 gr/dl). Nutritional status was determined based on BMI according to age and dietary patterns were collected using the FFQ questionnaire. **Results:** The study showed that 30.7% of anemia was found in adolescent girls of vocational school students in Bekasi with 48.1% mild anemia, 45.3% moderate anemia and 6.6% severe anemia. Nutritional status of most of samples (75.7%) were normal with 4.9% thin and 11.6% overweight/obese. More than 70% of samples did not fulfill the daily portion of vegetables, fruits and vegetable protein sources, while 48.4% consumed animal protein sources less than the recommended portion and only 24.6% consumed staple foods less than 3 times a day. **Conclusion:** Anemia remains as the highest nutritional problem compared to the problem of obesity and thinness in adolescent girls of vocational schools students in Bekasi. Most adolescent girl did not fulfill the recommended daily portion, especially in vegetables and fruit.

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Parboiling Induced Changes in The Morphological Aspects and Amylose-Amylopectin Ratio of Selected Rice Varieties

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Keywords: Parboiling · Amylose-amylopectin ratio · Scanning electron microscope

Background: Parboiling is a process developed for improving rice quality and it brings about a spectrum of qualitative changes in rice. The cooking and processing characteristics of rice are determined by amylose-amylopectin ratio of starch. Hence the present study was designed to analyze the morphological aspects and amylose – amylopectin ratio of starch granules. **Methhods:** Four rice Varieties, Jaya, Sulekha, D1 & Cheruvally were procured from Rice Research Station, Monkompu, Alapuzha, Kerala. The rice cultivars collected were cleaned manually for removing the extraneous matter. They were then subsequently cold soaked for 12 hours, hot soaked at 70°C for 3 hours, steamed, dried in sun and milled. Amylose and amylopectin content of the selected rice cultivars were determined spectrophotometrically and morphological aspects of the rice varieties were studied using Scanning Electron Microscopy. **Results:** The amylose-amylopectin ratio of raw, hot soaked and cold soaked rice samples were found to be in the range of 0.23–0.39. The above analysis showed that rice sample Jaya and Cheruvally belongs to intermediate amylose , Sulekha belongs to low amylose varieties and D1 belongs to high amylose varieties. **Conclusion:** Hydrothermal treatment results in granular disruption of starch and morphological aspects are influenced by fine structures and ratio of amylose and amylopectin molecules.

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Dietary Protein Restriction Increases Hepatic Leptin Receptor mRNA and Plasma Soluble Leptin Receptor in Rodents

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Keywords: Protein restriction · Soluble leptin receptor · Ob-R

Background: Leptin is an adipokine that regulates adipose tissue mass through membrane-anchored leptin receptor (Ob-R). Extracellular domain of Ob-R in plasma is called soluble leptin receptor (sOb-R), and is the main leptin-binding protein. This study aimed to clarify the effect of dietary protein restriction on hepatic Ob-R mRNA and plasma sOb-R levels. **Methods:** The effect of protein restriction on hepatic Ob-R mRNA level was examined using 5 weeks old Wistar rats fed either control diet with 20% casein (20C) or low-protein diet with 5% casein (5C) for 7 days and sacrificed after 12-h fasting or 12-h re-feeding following fasting. Effect of protein restriction on liver Ob-R and plasma sOb-R was investigated in 5 weeks old C57BL/6J mice fed 20C or 5C for 7 days. The direct effect of amino acid deprivation on Ob-R mRNA level was examined with hepatoma cells H4IIE. **Results:** Protein restriction increased hepatic Ob-R mRNA content more than fasting. Hepatic Ob-R mRNA level was also increased in protein restricted-mice although it did not increase in hypothalamus. Hepatic Ob-R protein was decreased, whereas plasma sOb-R was increased by protein restriction. Although plasma leptin concentration was not influenced by protein restriction, free leptin in plasma was significantly reduced. Ob-R mRNA content in H4IIE cells was not affected by amino acid deprivation in the medium. **Conclusion:** Dietary protein restriction increased hepatic Ob-R mRNA, resulting in increased plasma sOb-R concentration, which in turn, reduces plasma free leptin level and may modulate leptin activity.

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Relationship between Food Consumption and Physical Activity With Risk of High Blood Uric Acid Level in Elderly Women at Bogor Nursing Home

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Keywords: Elderly · Food consumption · Physical activity · Uric acid level

Background: Gout is a disease that causes joints to not function properly. The occurrence of gout is more caused by an unhealthy lifestyle, imbalance between consumption patterns and physical activity. The level of nutritional adequacy plays a role in maintaining purine levels in the body which are the cause of gout. The purpose of this study was to determine the relationship between food consumption and physical activity with blood uric acid levels in elderly women at Bogor Nursing Home. **Methods:** This research was conducted for 6 months starting from April to September 2017 using cross sectional design. Subjects were taken purposively with certain criteria and the number of subjects obtained were 30 elderly women. Primary data collected include subject charasteristics, eating habits, nutritional status, food consumption, physical activity and blood uric acid levels. The statistical analysis used *Chi-square* test to assess the relationship between variables **Results:** Most respondents' age range of 60–74 years old. Respondents of this study were categorized as having normal blood uric acid levels of 10 people and high blood uric acid levels of 20 people. Based on the level of nutritional adequacy, most respondents have sufficient levels of energy and protein adequacy and have physical activity in the light category. There was no significant relationship between coffee consumption habits, the adequacy level of energy and physical activity level with blood uric acid levels ($p > 0.05$). However, there was a significant relationship between water consumption, the adequacy level of protein and nutritional status with blood uric acid levels ($p < 0.05$). **Conclusion:** The result of this study found that proportion of gout respondents were 66.67%. There was a significant relationship between water consumption habits, protein adequacy and nutritional status with uric acid levels in elderly women at the Bogor Nursing Home.

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Effect of Seasonings and Storage Temperature on Resistant Starch Contents of Japanese White Rice

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Keywords: White rice · Seasonings · Storage temperature · Resistant starch

Background: Rice is staple food and major carbohydrate source in Japanese diet. Japanese white rice is cooked only with water. However, we cook white rice seasoned with salt or soy sauce and mixed with meat or seafood and vegetables. We also make vinegar rice for sushi. Starch retrogradation is one type of resistant starch (RS). RS escapes digestion until reaching colon and acts like dietary fiber. Recently, many studies suggest that RS, in addition to dietary fiber, may be beneficial for our health. The purpose of this study was to investigate the effect of salt or vinegar and storage temperature on RS synthesis of cooked rice. **Methods:** White rice was cooked using electrical rice cooker. The rice to water ratio was 1:1.5 (w:v). Rice were cooked with water contained 0%, 0.75% or 1.5% of NaCl and 0.1 M or 0.2 M of acetic acid. After cooking, RS contents were analyzed three storage temperature of rice: immediate after cooking, chilled (4C) for 24 hours after cooking and reheated using microwave after chilled for 24 hours. **Results:** The results showed that RS contents did not vary by adding different concentration of NaCl or acetic acid at immediate after cooking. All condition of cooked rice after chilled for 24 hours were higher RS contents than that of immediate after cooking. There were interesting findings that reheated rice cooked with 0.75% or 1.5% of NaCl increased RS contents compared with that of chilled for 24 hours. **Conclusion:** These results may imply that rice cooked with seasonings might be difficult to be re-gelatinized.

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Dietary 1-Kestose Improves Glucose Metabolism in Type 2 Diabetes (T2D) Rat

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Keywords: 1-kestose · Butyrate · Glucose metabolism · Type 2 diabetes model rat

Background: Previous study revealed that dietary 1-kestose, one of fructooligosaccharides, has been reported to modify microbiota in cecal contents of Sprague-Dawley rats, resulting in increasing in the butyrate concentration in the contents. In the present study, we examined effects of dietary 1-kestose on glucose metabolism in T2D rats. **Methods:** We used male Otsuka Long-Evans Tokushima Fatty rats (OLETF) aged 7 weeks as T2D rats along with their healthy model, male Long-Evans Tokushima Otsuka rats (LETO) aged 7 weeks. Rats were fed either control diet (CON, AIN-93G), or 1-kestose supplemented diet (KES, replaced 5% sucrose with 5% 1-kestose in AIN-93G) for 16 weeks. Plasma glucose and insulin levels were measured at 14, 18, and 22 weeks of age, and oral glucose tolerance test was conducted at 20–21 weeks of age. **Results:** Fasting plasma glucose level was the same among 4 groups until 18 weeks of age, and elevated only in OLETF/CON at 22 weeks of age ($P < 0.05$). Fasting plasma insulin levels tended to be higher in OLETF than in LETO during the experiment, but was higher in OLETF/CON than in other 3 groups at 18 weeks of age ($P < 0.05$). The glucose tolerance tended to be higher in OLETF/KES than in OLETF/CON, while it was low in OLETF compared to LETO ($P < 0.05$). **Conclusion:** Collectively, 1-kestose has a potential to improve glucose metabolism in the T2D rats.

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Developing a Rapidly Method of pMetMb-Sandwich-Elisa to Detect Pork Quality or Human Myodynamia

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Keywords: Porcine metmyoglobin · Specific polyclonal antibody · Specific monoclonal antibody · Sandwich ELISA

Background: A method of double-antibody sandwich ELISA established for monitoring pork quality or human myodynamia. Porcine metmyoglobin (pMetMb) is an ideal antigen, can be used to develop an accurate diagnostic method, due to its sensitive change of p pMetMb rotein structure. **Methods:** 1 Specific rabbit polyclonal antibody (PcAb) was purified from specific its anti-serum, when the titer of its anti-serum is over 1×105. 2 Specific mice monoclonal antibody (McAb) was prepared from the 4F2 cell ascite, when this titer is up to 1×105. 3 The double-antibody sandwich ELISA model is utilized to establish. 1 The optimal conditions under this model are 4 μg/mL McAb, 1% casein/ 60 min, pMetMb/90 min, 4 μg/mL PcAb/90 min, 1:4000 (V:V) 2nd Ab/45 min. Only McAb cultured under 4°C overnight, others cultured under 37°C. 2 Quality control of this double-antibody sandwich ELISA model. Antigen standard curve is range 0.04–5.120 μg/mL pMetMb, its linear equation is Y = 0.4959X-0.5788 (R^2 = 0.9919, P < 0.01). This method baseline is 0.027 μg/mL pMetMb (±3 SD), total recovery rate is 100.5%. 3 The method verification. 13×3×3 pork samples are tested, their pMetMb recovery rate was 86.0%-87.3%. **Conclusion:** There is no difference between batches (P > 0.05), while there is very significant difference among three pMetMb concentrations (P < 0.01). It is indicated this specific method of double-antibody sandwich ELISA is stability, very high accuracy and sensitivity, can effectively monitor pork quality.

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Hormetic or Biphasic Effects of Sulforaphane in Chemoprevention of Bladder Cancer

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Keywords: Sulforaphane · Bladder cancer · Hormetic effect

Background/Aims: The aim of this study was to investigate the biphasic effect of sulforaphane (SFN) on bladder cancer. **Methods:** *In vivo*, human bladder cancer T24 cells were cultured in RPMI-1640 medium. *In vitro*, N-butyl-N-(4-hydroxybutyl-nitrosamine was used to induce bladder cancer in male C57BL/6 mice, with or without SFN for 23 weeks. The protein expression of LC-II, mTO, S6K, Nrf-2, HMGA2 and β-actin were analyzed by western blotting. Cell viability assay was analyzed by MTT. The bladder tissues of all mice were fixed for hematoxylin-eosin staining. **Results:** There is a biphasic effect on cell viability and migration as well as the induction expression of Nrf2 and GSH by SFN. The potential mechanisms include the activation of autophagy, mTOR/S6K and HMGA2 signal pathways. *In vitro*, the lower dose of SFN

(2.5 mg/kg body weight) promote the carcinogenic effects of BBN on mice with decreased survival rates and increased bladder weight compared with bladder cancer group. Meanwhile, the survival rate increased and bladder weight decreased with reducing submucosal capillary growth in the higher dose of SFN group (10 mg/kg body weight) when compared with the bladder cancer model group. **Conclusion:** These findings provide novel insights in the biphasic effect of SFN on bladder cancer.

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Effects of Djulis (*Chenopodium formosanum*) Hull Extracts on HT-29 Human Colon Cancer Cells

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Keywords: *Chenopodium formosanum* · HT-29 colon cancer cells · Total polyphenol contents · Antiproliferation

Background: Colorectal cancer (CRC) is one of the most common cancers in developed countries. Previous studies have shown that diet rich in polyphenols is related to low CRC incidence. Djulis (*Chenopodium formosanum*) is a native crop in Taiwan and is known for its abundant functional ingredients. Recent studies revealed that there were more total polyphenols and total flavonoids contents in djulis hull than seed. In addition, djulis hull could inhibit colonic preneoplastic lesions in rats. In this study, we aimed to evaluate total polyphenol contents in the water extracts of djulis hull (WDH), 70% methanol extracts of djulis hull (70 MDH) and 100% methanol extracts of djulis hull (100 MDH). Meanwhile, we investigated the antiproliferative effect of WDH, 70 MDH and 100 MDH on HT-29 human colon cancer cells. **Methods:** The total polyphenol contents were determined by the Folin-Ciocalteu method. Cell viability was examined by 3-(4,5-dimethylthiazol-2-yl)-2, 5,-diphenyltetrazolium bromide (MTT) assay. **Results:** The results demonstrated that WDH (73.26 ± 3.61 μg GAE/mg) had higher total polyphenol contents compared to 70 MDH (68.08 ± 3.18 μg GAE/mg) and 100 MDH (48.29 ± 3.61 μg GAE/mg). WDH, 70 MDH and 100 MDH significantly inhibited proliferation of HT-29 colon cancer cells. WDH showed the lowest IC50. **Conclusion:** These results suggest that WDH may induce cytotoxicity in HT-29 colon cancer cells due to its plentiful polyphenol contents. WDH containing high polyphenol contents can be developed as a functional healthy food in future.

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Effect of Long Term Water Deprivation on Pathological Development in Kidney

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Keywords: Glomerulonephritis · Dehydration · Rehydration · Tgf-beta · Mcp-1 · Soluble antigen-antibody immune complexes

Background: Global temperatures have been going up. The global warming leads to more heat extremes and gives rise to different risk in health. Insufficient water intake and excessive body fluid loss might occur in human being, when elevation of global temperature in summer. Insufficient water intake as well as excessive body fluid loss might cause dehydration. **Methods:** To validate the impact of dehydration on pathophysiological progression, mice as translational model elucidates dehydration elicited kidney injury. Water deprivation (WD) and cyclic water deprivation as recurrent dehydration (RD) were dealt to pathological cause in kidney. After WD and RD, serum osmolarity and sodium were elevated. PAS staining reported brush border lesion and mesangial expansion in glomeruli in the mice with RD manipulation. To gain pathological insight in kidney after RD and WD, immunohistochemical examination with antibodies recognized respectively MCP-1 and TGF-beta was performed to dissect renal injury. **Result:** As noted in MCP-1 staining, it displayed notable glomerular inflammation and MCP-1 staining is relatively weak in renal tubules. On the other hand, immunohistochemical examination with TGF-beta antibody displayed higher TGF-beta present in glomeruli but not renal tubule after RD administration. Likely, RD manipulation as well as dehydration cause glomerular inflammation and arises TGF-beta singling in glomeruli. Suggesting dehydration led to elevation of serum sodium and osmolarity. Higher sodium and osmolarity might elicit more soluble antigen-antibody immune complexes (SCs) in blood. Accumulation of SCs in glomeruli could be a pathological cause associated glomerular inflammation with MCP-1 secretion. **Conclusion:** As consequence, the MCP-1 activates TGF-beta signaling to induce glomerulonephritis.

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Psidium guajava L. Inhibit Inflammatory and Improve Antioxidant Activity in Mouse Macrophage Cell Lines

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Keywords: Anti-inflammation, *Psidium guajava*, intracellular ROS

Background: Chronic inflammation has been proven to be a factor in the development on pathogenesis of several chronic diseases such as diabetes, obesity and cancer. *Psidium guajava L.*, a Thai traditional fruit, has been reported to have biological properties such as antioxidant and anti-diabetic, however its mechanism related to inflammation has not been studied. This study aims to determine the inhibitory effects of *P. guajava* fruit ethanol extract on anti-inflammation and intracellular ROS accumulation in lipopolysaccharide-activated RAW 264.7 murine macrophage cells line. **Methods:** RAW264.7 cells were pre-treated with the *P. guajava* fruit extract at 0.25, 0.5, 1 and 2 mg/mL for 1 h before inducing with lipopolysaccharide 5 ng/ml for further 24 h. Cell viability and nitric oxide production were determined by cell proliferation WST-1 assay and Griess reaction. Intracellular ROS was assessed by fluorescent signal from oxidized 2¢,7¢-dichlorofluorescein diacetate. TNF-alpha and IL-6 production were measured by ELISA. **Results:** Pre-treatment of *P. guajava* fruit extract significantly suppressed LPS-induced nitric oxide, Intracellular ROS, TNF-alpha and IL-6 production in a dose-dependent manner. **Conclusion:** These results suggested that *P. guajava* fruit extract has a potential to reduce inflammation and to improve antioxidant activity in cellular level. However, the effect of *P guajava* in reducing inflammation-associated chronic diseases should be explored in further study.

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Effect of Ketogenic Diet on Blood-Brain Barrier Injury in Mice Fed Long-Term High-Fat-High-Cholesterol Diet

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Keywords: Insulin resistance · Alzheimer's disease · Blood-brain barrier · Medium-chain triglyceride

Background: Alzheimer's disease (AD) is one of the most common form of dementia and the prevalence is increasing. The Western dietary pattern which is high in saturated fat and cholesterol that cause obesity and Type II diabetes, which is one of the main causes of Alzheimer's disease. Obesity is associated with blood-brain barrier (BBB) dysfunction and learning and memory deficits, which may result in the insulin resistance in the brain, change the permeability and cause damage of BBB. We investigated the effects of medium chain triglyceride (MCT) on BBB injury after a long-term consumption of a high-fat-high-cholesterol diet using a mice model. **Methods:** Seventy male C57BL/6 mice were randomly divided into control and high fat high cholesterol (HFHC) group and fed for 16 weeks. After the Morris water maze (MWM) test was performed, mice were sacrificed, blood and brain tissues were collected for analysis. The rest of mice in HFHC group were then randomly separated into HFHC, MCT and HFHC with Metformin group and fed for another 8 weeks, after water maze test was performed, mice were sacrificed, blood and brain tissues were collected for analysis. **Results:** There was a significant higher escape latency in HFHC group after 16 weeks feeding. After an 8-weeks feeding, both MCT and Metformin groups showed improvement as represented by an increase in time spending in target quadrant

and number of crossing. **Conclusion:** High fat high cholesterol diet has a partial to adverse the impact of HFHF diet on cognitive performance.

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1,25-Dihydroxyvitamin-D3 Inhibits Renal Oxidative Damage via The PARP1/SIRT1/ NOX4 Pathway in Zucker Diabetic Fatty Rats

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Keywords: 1,25-dihydroxyvitamin-D3 · Diabetic nephropathy · Oxidative stress · PARP1-SIRT1-NOX4 axis

Background: Diabetic nephropathy (DN) is one of the most important renal complications associated with diabetes and the mechanisms are yet to be fully understood. To date, few studies have shown the anti-oxidant effects of 1,25-dihydroxyvitamin-D3 (1,25(OH)2D3) on hyperglycemia-induced renal injury. The aim of the present study was to explore the potential mechanism by which 1,25(OH)2D3 reduced oxidative stress in diabetic rat kidneys, focusing on its regulation of pivotal proteins. **Methods:** In this study, we used a spontaneous diabetes model: Zucker diabetic fatty (ZDF) rats, two groups of male Zucker lean (ZL) rats and four groups of male ZDF rats on a vitamin D-deficient diet were treated with or without 1,25(OH)2D3. 1,25(OH)2D3 was administered intragastrically every two days, at doses of 2, 8 and 16 μg/kg·bw, for 7 weeks. **Results:** ZDF rats treated with 1,25(OH)2D3 decreased body weight, food intake, water intake and urine volume. 1,25(OH)2D3 ameliorated blood glucose and abnormal glucose tolerance. Additionally, 1,25(OH)2D3 not only significantly lowered Microalbuminuria and urine creatinine contents, but also inhibited glomerular hypertrophy and decreased the thickness of the glomerular basement membrane. Furthermore, 1,25(OH)2D3 attenuated renal oxidative indicators and notably inhibited PARP1, activated SIRT1 and decreased the expression of NOX4. Of interest, the abovementioned proteins could be involved in the anti-oxidant mechanism of 1,25(OH)2D3 in diabetic rat kidneys. **Conclusion:** Our study not only showed that oxidative stress was a major contributor to DN pathogenesis, but also uncovered the antioxidant role of 1,25(OH)2D3 in diabetic nephropathy, which was associated with the PARP1/SIRT1/NOX4 pathway.

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Assessment for Food Matrices Reference Material Using Nuclear Activation Analysis

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Keywords: Assessment · Food matrices reference material · NAA

Background: Food is the main source of macro, micro and trace elements which may play different role in human organism, that is, nutritional, essential, and/or toxic. The levels of these elements are among the factors that characterize the safety and quality of foodstuffs. Therefore, reliable and accurate data are required. Nuclear analytical technique particularly nuclear activation analysis (NAA) has widely been applied in several field including food matrices analysis so that the analytical data obtained to support research in these fields must be controlled, selective, and should be verified by quality assurance procedures. Analysis results quality are shown by the presentation of accurate measurement data and have high precision. Accuracy and precision of data generated from NAA method and tested its validity. **Methods:** In this study, assessment was conducted by analyzing food ingredient standard reference material, SRM NIST 1567a Wheat Flour. The analysis was carried out since 2012 to 2018. **Results:** The results especially for long lived radionuclides such as Fe, Zn and Se gave accuracy (%recovery) were in a good results. Replication of analysis using food matrices reference materials indicated values that were in the range of acceptable bias. **Conclusion:** Data of elemental analysis in food matrices reference materials using NAA were considered as valid, accurate and reliable data.

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Precision Analysis of Phytosterols in Human Blood and Factors Influencing Its Concentration

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Keywords: Phytosterol · LC-MS/MS · Cholesterol, human

Background: Humans ingest phytosterols (b-Sitosterol, Campesterol etc.) from plant foods. After intestinal absorption of dietary phytosterol and cholesterol through NPC1L1, they are secreted into the intestine by the ATP-binding cassette half-transporters ABCG5 and ABCG8. This absorption capacity greatly differs between individuals. Higher absorption capacity of cholesterol increases the absorption capacity of phytosterol. On the other hand, to decrease blood cholesterol level for hypercholesteremia patients, cholesterol biosynthesis or absorption needs to be inhibited. Therefore, if phytosterol level can be used as an index to investigate the cause of abnormality in cholesterol level, it should be selected exactly whether to target synthesis or absorption. **Methods:** In this study, we established a rapid and simple blood phytosterol analysis method and searched for factors related to phytos-

terol level in addition to cholesterol. Blood samples were collected from 177 subjects and plasma was obtained by centrifugal separation. From 20 μl plasma samples, non-esterified sterols were extracted by using methanol while all sterols were firstly hydrolyzed using sodium hydrate followed by extraction using methanol. Extracted samples were quantified quickly and accurately using atmospheric pressure photoionization liquid chromatography-tandem mass spectrometry (APPI-LC-MS/MS). **Results:** Blood phytosterol levels greatly varied depending on the sample, and it was confirmed that the individual difference was large in the phytosterol and cholesterol absorption ability. In addition, blood biochemistry parameters were measured followed by researched correlation with blood phytosterol level. **Conclusion:** Blood phytosterol and HDL-cholesterol levels had strong positive correlation. Thus, it was suggested that consuming a lot of plant foods would improve lipid metabolism.

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A Novel Derivative of Caffeic Acid Inhibits The Proliferation of Colorectal Cancer Cells

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Keywords: Decyl caffeate · Akt · STAT3 · Cell cycle arrest · Autophagy · Apoptosis · Colorectal cancer
Background: The treatment of colorectal cancer cells obtained by blocking the aberrant activation of the survival signaling pathways has received considerable attention in recent years. **Methods:** Previous studies showed that CAPE inhibited the proliferation of several types of cancer cells. In this study, we report that decyl caffeate (DC), a novel derivative of caffeic acid, significantly inhibited the proliferation of human colorectal cancer (CRC) cells both in vitro and in vivo. **Results:** The results show that DC differentially inhibited the proliferation of hCRC HCT-116 and HT-29 cells through an induction of cell cycle arrest at S phase. DC inhibited the expression of cell cycle regulatory proteins including cyclin A and cyclin E. The mechanism of action was associated with the inactivation of the Akt and STAT3 cell survival signaling pathways. Interestingly, high dose of DC induced a feedback self-protection through an induction of autophagy in HCT-116 cells. Blockade of autophagy further induced apoptosis in DC-treated HCT-116 cells. Moreover, DC consumption inhibited the growth of CRC in a xenograft mouse model. **Conclusion:** In conclusion, our results suggest that DC significantly inhibits the proliferation of CRC cells and therefore has potential as an anti-cancer therapeutic agent.

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The Effect of Giving Green Tea Extract to Lower Limb Muscle Strength in The Elderly

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Keywords: Green tea · Physical performance · Muscle strength
Background: The increasing number of Indonesian elderly can be burden for the country if the health status of the elderly is low. The ability of mobility, especially walking ability, influences the quality of life of the elderly. Skeletal muscle strength in the elderly will decrease by> 50%. This decrease in muscle strength is caused by an increase in oxidative stress. Tea is one of the favorite drinks of the elderly. Green tea extract has a high antioxidant content. This study to determine the effect of giving green tea extract on muscle strength of the elderly lower extremity. **Methods:** This was an experimental study using a pre-test and post-test design with control design. Sixty-one elderly from Abiyoso and Budi Luhur BPSTW who met the inclusion and exclusion criteria were divided into two groups. **Result:** The intervention group was given green tea extract two capsules a day (± 168 mg catechins and 95 mg EGCG), and the control group received a placebo for 30 days. The measurement of muscle strength of the lower limb was carried out by the Timed Up and Go Test (TUG) method. At the end of the study, there was a tendency to decrease travel time in conducting the Timed Up and Go Test (TUG) in the group who received green tea extract intervention. **Conclusion:** The time reduction in the intervention group was not significantly different from the control group (p > 0.05). The consumption of green tea extract has the potential to inhibit the decrease in muscle strength in the elderly.

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Body Image as The Main Risk Factor of Tendency of Eating Disorder in Teenagers

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Keywords: Eating disorder · Body image · Teenagers
Background: The incidence and prevalence of eating disorders (ED) in teenagers has increased significantly in recent decades. Nowadays many teenagers think about appearance and body image. Body image research has argued that body gender stereotypes change from one culture to another and over time. These beauty standards generate anomalous concerns and behaviors linked to body image and directed at obtaining these ideals. These sociocultural influences appear to have functioned as a protective factor for body image disorders in woman and man. Eating disorders theorists and feminist scholars have long indicted fashion magazines, movies, television, and advertising for their advocacy of disordered eating. **Results:** A sociocultural model emphasizes that the current societal standard for thinness, as well as other difficult-to-

achieve standards of beauty for women, is omnipresent and, without resorting to extreme and maladaptive behaviors, all but impossible to achieve for the average woman. The incidence and prevalence of eating disorders (ED) in teenagers has increased significantly in recent decades. That diet and appetite are closely linked to psychological health and emotional well-being is widely recognized. Psychological factors often influence eating habits. Many people overeat when they are bored, stressed, angry, depressed, or anxious. Women tend to be very concerned about body shape and according to their perception of body shape that is both thin and slender body.

The Effect of Fatty Acids on The Oxidative Stress Sensitivity in Vascular Endothelial Cells

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Keywords: Fatty acids · Oxidative stress · Vascular endothelial cells
Background: Reactive oxygen species react with many molecules of living oganisms such as lipids, proteins, and nucleic acids and cause damage to cells and tissues, resulting in functional impairment of them. Reactive oxygen species were also known to promote aging. It is said that humans aging with blood vessels and blood vessels are one of tissues that are injured by reactive oxigen species. It is suggested that vascular endothelial dysfunction by oxidative stress caused by reactive oxygen species is greatly involved in the outset and progression of various age-associated diseases such as hypertension, arteriosclerosis, diabetes, heart failure, or inflammatory disease. Therefore, protecting vascular endothelial cells from oxidative stress or increasing resistance to oxidative stress is important for the prevention of various age-associated diseases and the healthy longevity. **Methods:** In this study, we focused on fatty acids whose contribution to vascular endothelial function is known and examined how fatty acids present to some extent in vivo affect oxidative stress sensitivity of vascular endothelial cells. We generated cytotoxicity by reactive oxygen species by administering hydrogen peroxide to human umbilical vein endothelial cells (HUVEC). After pretreating HUVEC with various fatty acids (palmitic acid, stearic acid, oleic acid, linoleic acid, arachidonic acid, α-linolenic acid, eicosapentaenoic acid, docosahexaenoic acid), we administered hydrogen peroxide and investigated subsequent cell proliferation. **Result:** As a result, it was indicated that depending on the type of fatty acid, there was a difference in the effect on oxidative stress sensitivity of vascular endothelial cells.

The Effect of Japanese Cuisine on Autonomic Nervous System Activity

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Keywords: Autonomic nervous avtivity · Japanese cuisine, mood states
Background: Recently, some studies have indicated that Japanese style cuisine brings beneficial influence on health. In this study, we focused on the effects of some traditional ingredients of Japanese dishes (Dashi, Sansyo, Wasabi, Yuzu) on the autonomic nervous system (ANS) activity and mood states in human. "Dashi" is the Japanese soup stock and is used in many traditional Japanese cuisine. It's taste and flavor assume a fundamental part in most of the dishes. Sansho, Wasabi and Yuzu are Japanese spices, which provides specific flavor of Japanese cuisine. **Methods:** Heart rate variability (HRV) was employed to assess autonomic nervous system (ANS) activity. Profile of mood states was determined by the 4-point scale questionnaire consists of 30 words related to an emotional state. Preference for each ingredients were also determined by a Visual Analog Scale (VAS) method. **Result:** We observed a transient increase in parasympathetic nervous activity after intake of dashi. Interestingly, the inhalation of dashi odor also induced a similar effect on ANS. **Conclusion:** These results suggests that dashi intake may elicit effects of relaxation via an elevation of parasympathetic nervous activity and that the odor of dashi may play an important role in this function. Japanese spices examined in this study have also alter the mood states and ANS. We believe that the results of this study will contribute to the improvement of human mental health.

The Inhibitory Effect of Plum Mango (*Bouea macrophylla* Griff.) Young Leaves Extract on α-Glucosidase

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Keywords: Alpha glucosidase inhibition · Gandaria leaves · Phytochemical content
Background/Aims: *Bouea macrophylla* Griff. or plum mango or gandaria (Indonesia) is a tropical fruit tree native to Southeast Asia and its young leaves usually consumed as vegetables in West Java, Indonesia. The objective of this study was to investigate the inhibitory effect of plum mango young leaves extract (PMLE) on α-glucosidase. **Methods:** To investigate the inhibitory effect of PMLE on α-glucosidase, the leaves sample was extracted by decoction method then dried by spray dryer. Total phenolic content, total flavonoid, and potency of α-glucosidase inhibition from the PMLE were examined. **Results:** The phytochemical analysis indicated that total phenolic and flavonoid contents in PMLE were

49.34 mg gallic acid equivalent/g of crude extract and 1.57 mg quercetin equivalent/g of crude extract, respectively. The PMLE inhibited α-glucosidase activity with IC50 value of 79.83 mg/L. **Conclusion:** These results demonstrated the beneficial biochemical effects of PMLE by inhibiting α-glucosidase which part of the anti-hyperglycemic properties.

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Effect of Sweet Basil Fractional Extract on 3T3-L1 Adipocytes

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Keywords: Adipocytes · Sweet basil · PPAR gamma

Background/Aims: Obesity is considered as a risk factor of diabetes and dyslipidemia. Hence, obesity improvement has been suggested to prevent lifestyle-related diseases. Ocimum basilicum (sweet basil) is a kind of herb and is used in various dishes. However, its benefits with regard to obesity are unclear. Therefore, we investigated the effects of sweet basil fractional extract on 3T3-L1 adipocytes. **Methods:** Sweet basil leaves were powdered after freeze-drying and a fractional extract was obtained using each of the following solvents: Milli-Q water, methanol, ethyl acetate, diethyl ether, and hexane. After removing the solvent using an evaporator or freeze dryer, the extract was then dissolved in 25 mg/mL of dimethyl sulfoxide or Milli-Q water. 3T3-L1 preadipocytes were cultured for 12 days to allow differentiation to mature adipocytes. These adipocytes were treated with each fractional extract (final concentration: 25 μg/mL) for 24 h after the induction of differentiation. After collecting the adipocytes, mRNA expression was measured using real-time polymerase chain reaction. Additionally, protein expression was measured using western blotting. **Results:** PPARγ mRNA expression was significantly lower with the ethyl acetate extract than with the control group. Moreover, MCP-1 mRNA expression tended to be lower with the ethyl acetate extract than with the control group. **Conclusion:** These results suggest that sweet basil has an anti-obesity effect and will be beneficial as a functional food.

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Ameliorative Effect of Lespedeza Bicolor Extract on Hepatic Abnormality Induced by Methylglyoxal Induced Glucotoxicity in HepG2 Cells

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Keywords: Lespedeza bicolor · Glucotoxicity · Hepatic damage ·Oxidative stress · Inflammation

Background/Aims: *Lespedeza Bicolor* (LB) is an ornamental plant used as a traditional medicine for the treatment of inflammation and diabetes. In the present study, we investigated the protective effect of LB against methylglyoxal (MGO) induced glucotoxicity and elucidated the molecular mechanisms of apoptosis and autophagy associated with oxidative stress and inflammation in HepG2 cells. **Methods:** HepG2 cells were cultured under standard cell culture conditions (37°C in a humidified incubator containing 5% CO). Advanced glycation end products (AGEs) formation was examined by AGEs formation assay. AGEs breaking ability of LB was evaluated by breaking of MGO-bovine serum albumin using the 2,4,6-trinitrobezenesulforic acid(TNBS) assay. Furthermore, the effects of LB on MGO-induced autophagy, apoptosis, oxidative stress and inflammation were measured by western blot. **Results:** LB extract inhibited MGO-induced AGEs formation and increased AGEs breaking. Furthermore, LB extract ameliorated inflammation (tumor necrosis factor-α, interleukine-6 and c-reactive protein), oxidative stress (NADH quinone dehydrogenase 1, Mn superoxide dismutase (SOD) and CuZn-SOD), and apoptosis (Bax/Bcl$_2$ and caspase-3) with enhancement of autophagy activation (phospho AMP-activated protein kinase (pAMPK)/AMPK, phospho mammalian target of rampamycin (pmTOR)/mTOR, Foxo3a and microtubule associated protein1A/1B light chain 3(LC3)II/LC3I) against MGO-induced glucotoxicity in vitro. **Conclusion:** In conclusion, LB extract might be beneficial for glucotoxicity induced hepatic damage by modulation of oxidative stress, inflammation, autophagy and apoptosis.

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Glabridin Inhibits Dexamethasone-Induced Muscle Atrophy

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Keywords: *Glabridin* · Muscle atrophy · Glucocorticoid receptor · FoxO3a

Background/Aims: Prevention of muscle wasting is known to contribute to improving the quality of life and extending a healthy life. Recently, we have reported that licorice flavonoid oil containing glabridin, which is an isoprenyl flavane, enhances muscle mass in mice. **Methods:** We investigated the prevention effect of glabridin on dexamethasone-induced muscle atrophy and clarified its

mechanism in cultured myotubes and muscle of mice. C2C12 myptubes were treated with glabridin and estimated its preventive effects on dexamethasone-induced protein degradation. Gabridin was orally given to C57BL/6J mice and confirmed prevention of dexamethasone-induced muscle atrophy. Glabridin inhibited dexamethasone-induced protein degradation through dexamethasone-induced expression of ubiquitin ligases, MuRF1 and Cbl-b in C2C12 myotubes. Mechanistically, glabridin inhibited nuclear translocation of the glucocorticoid receptor through competitively bound to the glucocorticoid receptor. Glabridin also inhibited dexamethasone-induced phosphorylation of p38 and FoxO3a, an event upstream of the induction of ubiquitin ligases in C2C12 myotubes. Moreover, the glabridin-induced inhibition of protein degradation was eliminated by knockdown of the glucocorticoid receptor, but not by p38 knockdown. **Results:** These data indicated that the inhibitory mechanism of glabridin against dexamethasone-induced muscle atrophy was mainly mediated by the inhibition of binding between dexamethasone and the glucocorticoid receptor in myotubes. Oral administration of glabridin prevented dexamethasone-induced muscle atrophy in the tibialis anterior muscle of mice. It was confirmed that glabridin inhibited dexamethasone-induced nuclear translocation of the glucocorticoid receptor and phosphorylation of FoxO3a in the muscle of mice. **Conclusion:** Glabridin is an effective food ingredient for the prevention of skeletal muscle atrophy.

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Oleocanthal, a Polyphenolic Component in Extra Virgin Olive Oil, Inhibits The Different Agonists-Induced Uterine Contraction Ex Vitro

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Keywords: Dysmenorrhoea · Uterine contraction · Extra virgin olive oil · Oleocanthal
Background/Aims: Oleocanthal is a polyphenolic component which exists in extra virgin olive oil with anti-inflammatory effect. Primary dysmenorrhea is a chronic inflammation that occurs in adolescent women. The severe pain and symptoms may require bed rest and affects daily life and work. Objective of this study is the effect of oleocanthal on uterine contraction in female Sprague-Dawley (SD) rats: an ex vitro study. **Methods:** The uterus was taken from the female SD rats weighing 200~300 g and each uterine horn was cut into segments of equal length. The segments were placed in isolated organ baths containing physical solution at 37 °C with 95% O2 and 5% CO2 supply to maintain its activity. Added different agonists (prostaglandin F2α, PGF2α, oxytocin, carbachol, acetylcholine, potassium chloride, Bay K 8644) after equilibrium contraction, and oleocanthal were cumulatively added to the organ bath. **Results:** Contraction were recorded with force displacement transducers. Different concentrations of oleocanthal can inhibit PGF2α (10–6 M), oxytocin (10–7 M), carbachol (10–6 M), acetylcholine (10–6 M), potassium chloride (50 mM) and Bay K 8644 (10–6 M)-induced contraction in a dose-

dependent manner. Different concentrations of oleocanthal effectively inhibit uterine contraction induced by different agonists, indicating that oleocanthal is a non-specific inhibition on uterine contraction.

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A Bifidobacterium Strain Differentially Alters Components of Systemic and Mucosal Immunity in Mice

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Keywords: Probiotic · Systemic and mucosal immunity · T cell
Background/Aims: Probiotic bacteria are functional ingredients that have been found to provide significant health benefits, including improvement in host immune function. Our previous study has reported that probiotics in the genera Bifidobacterium stimulate systemic T cell and cytokine responses in healthy adults. Little is known whether mucosal immunity is also altered by Bifidobacterium strain(s). The goal of the current study was to evaluate the effect of one Bifidobacterium strain on both systemic and mucosal immune responses in mice. **Methods:** C57BL/6 mice (n = 8/group; female; 10–12 weeks old) were provided with chow diet ad libitum, and received oral administration of either log 10 ± 0.5 CFUs/day of Bifidobacterium strain in phosphate buffer saline (PBS) in the intervention group or PBS alone in the control group for 4 weeks. Food intake and body weights were recorded every week. At the end of the study, peripheral and mucosal immune tissues, including spleen, mesenteric lymph nodes (MLN), inguinal lymph nodes (ILN), and Peyer's patches (PP) were isolated, and functional and phenotypic marker expressions were assessed. **Results:** The distribution of immune cell subsets (e.g. T and B lymphocytes, nature killer cells, dendritic cells, macrophages and granulocytes) in all immune tissues were not different between groups. ILN and PP T cell proliferation was also similar between groups. However, splenic and MLN T cell proliferation following anti-CD3 stimulation were significantly higher in the intervention compared to the control group (both P < 0.05). **Conclusion:** Our study suggests that the Bifidobacterium strain differentially alters components of systemic and mucosal immunity in mice.

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Eggshell Membrane Powder Improves Cachexia in IL-10A/A Mice by Inhibiting The LPS/IL-1 Mediated Pathway and Alleviating Microbial Dysbiosis

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Keywords: Egg shell membrane · IL-10–/– mice · Gut microbiota · Cachexia

Background/Aims: The cytokine synthesis inhibitory factor of IL-10 could improve the cachexia condition via down-regulating the expression of T cell-derived cytokines. In our previous study, we have showed that egg shell membrane (ESM) supplementation could ameliorate dextran sodium sulfate induced intestinal inflammation in mice. **Methods:** In this study, we utilized the IL-10 KO mice to imitate the occurrence of cachexia and investigate the effect of ESM on cachexia. Five-week-old male IL-10–/– mice were fed AIN-93G diet (KO) and 8% ESM-containing AIN-93G diet (KOE) during 28 weeks. C57BL/6 wild-type mice were used as control (WT). The weight of tissues, biochemical markers of lipid metabolism, anemia, and colonic inflammation were measured. Hepatic and colon mucosa RNA were subjected to microarray analysis (Mouse Genome 430 2.0 Array, Affymetrix) followed by Reverse Transcription-Polymerase Chain Reaction (RT-PCR) test and IPA analysis. Cecal bacteria DNA was used for metagenomic analysis. **Results:** The body weight loss and tissue weights, as well as the ratio of colon weight to length were significantly improved by EMS. The transcriptomic and RT-PCR results indicate that EMS inhibited the LPS/ IL-1 mediated RXR function pathway in liver, and down-regulated the expression of chemokines in colon. The metagenomics analysis showed that microbiota diversity and composition was altered, and the relative abundance of specific bacteria related to energy metabolism and inflammation degree were ameliorated via ESM. **Conclusion:** These findings indicate that ESM might improve cachexia condition in IL-10 KO mice via attenuating the inflammation degree and microbiota composition.

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Anti-Obesity Effect of Tannic Acid is Mediated by Epigenetic Regulation of *Cmip* Gene

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Keywords: Tannic acid · Epigenetics · *Cmip* gene · Nonalcoholic fatty acid

Background/Aims: Our previous studies suggested that tannic acid (TA), a plant-derived polyphenol found in many plants, is involved in epigenetic regulation. TA is presumably a novel histone acetyltransferase inhibitor (HATi) and exerts therapeutic effects on the development of nonalcoholic fatty liver disease (NAFLD). **Methods:** Based on this study, we extensively investigated the effect of TA on DNA methylation, another mechanism associated with epigenetic regulation. Mice were fed a high fat, high sucrose diet (HFHS) with or without supplementation TA (w/w) for 12 weeks. A total of 500 ng of genomic DNA from mice liver tissues was used as libraries and were analyzed with Bisulfite Amplicon Sequencing (*BSAS*). **Results:** In liver tissues, HFHS increased the lipid levels and significantly decreased the methylation at CpG3~CpG10 for the *Cmip* amplicon compared to those with normal diet. Interestingly, supplementation of TA decreased the elevated lipid profile induced by HFHS and increased the methylation at CpG3~CpG10 for the *Cmip* amplicon. Finally, we investigated the possibility that TA-regulated methylation pattern was correlated with gene expression of *Cmip* in liver tissues. RT-PCR revealed that HFHS increased the *Cmip* gene expression compared to normal diet, and *Cmip* gene expression was decreased by TA. **Conclusion:** Our findings demonstrate that the preventive effect of TA on NAFLD is mediated by inhibition of *Cmip* gene via hypermethylationat CpG3~CpG10. Therefore, TA may be an epigenetic modulator of gene expression in a variety of disease models.

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Comparison of the Antioxidant Activities and Total Phenol Contents of Aronia and Theobroma Cacao Powder

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Keywords: Cacao · Aronia · Antioxidant activitiy

Background/Aims: Cacao(*Theobroma cacao*) and aronia have been considered as strong antioxidants due to its abundant phenolic and especially flavonoid contents. In this experiment, the antioxidant activities and phytochemical concentration of cacao and aronia powder extracts were compared with different extraction solvents. **Methods:** Four different cacao extract samples were examined to identify anti-oxidative activities; cacao powder extracted in 70% methanol solution(CM), cacao powder extracted in 80% ethanol solution(CE), aronia powder extracted in 70% methanol solution(AM) and aronia powder extracted in 80% ethanol solution(AE). All powders were freeze dried. Total phenolic compound content(TPC) was analyzed using gallic acid as standard solution and total flavonoid content(TFC) was estimated based on the standard curve of quercetin. ABTS scavenging activity was measured with ABTS reagent diluted with PBS(pH7.4) and 2.5 mM ABTS. The DPPH radical scavenging activity was assessed by 1 mM DPPH methanol solution. **Results:** The TPC values of CM, CE, AM, and AE were 49.8 mgGAE/g(CM), 51.9 mgGAE/g(CE), 47.3 mgGAE/g(AM), and 45.9 mgGAE/g(AE) respectively. The TFC results were 85.1 mgQE/g(CM), 89.7 mgQE/g(CE), 47.2 mgQE/g(AM), and 53.3 mgQE/g(AE) respectively. CE group showed significantly higher DPPH radical scavenging activity compared to the other samples. ABTS radical scavenging activity results were insignificantly different. **Conclusion:** The results of this study show that cacao powder extracts have significantly higher TFC and DPPH radical scavenging activity compared to aronia powder extracts. TPC and ABTS radical scavenging activity were not significantly different among all samples. Freeze dried

cacao powder extracted in 80% ethanol solvent was proven to be more anti-oxidative than aronia which is a well-known antioxidant.

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Effects of Saba Banana (*Musa acuminata* x *Balbisiana*) Peel Flour on Lipid Profile of Male Wistar Rats Treated With Repeatedly Heated Cooking Oil

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Keywords: Antioxidant · Lipid profile · Banana peel flour
Background/Aims: Saba banana (*Musa acuminata* x *balbisiana*) peel is potential to prevent lipid peroxidation and improve lipid profile. Saba banana peel contains several types of antioxidant, such as carotene, β – carotene, vitamin C, tannin, polyphenol, flavonoid, and saponin. The antioxidant activity test on the Saba banana peel flour showed inhibitory concentration 50% (IC50) values is 3.8 part per million (ppm). This study aimed to investigate the effects of Saba banana peel flour in various dosages on HDL, LDL, triglyceride and total cholesterol serum levels of male Wistar rats which were treated with a repeatedly heated cooking oil. **Methods:** This true experimental study used a controlled group post test design. A total of 25 male Wistar rats were divided into 5 groups, namely (1) a negative control group, (2) a positive control group treated with a repeatedly heated cooking oil, as well as the groups treated with a repeatedly heated cooking oil with 0.5 ml/rat, 1 ml/rat, 2 ml/rat of Saba banana peel flour solution in 15 days, for group (3), (4), and (5) respectively. Each group was given a normal diet. *Result:* The result showed that there was no significant difference in HDL, LDL, triglyceride and total cholesterol serum on all group (p > 0.05). **Conclusion:** It suggests that Saba banana peel flour can not significantly improve the lipid profile of male Wistar rats treated with repeatedly heated cooking oil for 15 days.

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MTHFR C677T Polymorphism Increases MTX Sensitivity via the Inhibition of S-Adenosylmethionine and De Novo Purine Synthesis

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Keywords: Metabolism · Immune suppressants · Pharmaco genomics · Rheumatoid arthritis · Single nucleotide polymorphism · Therapeutic drug monitoring · Folate
Background/Aims: Currently no guidelines are established for pharmacogenomic testing involving folate metabolic genes in long-term disease-modifying antirheumatic drugs (DMARD) therapies. We carefully investigated how common genetic variations in methylenetetrahydrofolate reductase (MTHFR) influence cellular metabolic kinetics in response to methotrexate (MTX). **Methods:** Two distinct cell models: HepG2 with stabilized MTHFR inhibition using shRNA delivered by a Lentiviral vector; and Epstein-Barr virus transformed human lymphoblasts expressing MTHFR polymorphic allele 677C and 677T were used. Disease activity and DMARD use were compared between MTHFR677CC, CT and TT rheumatoid arthritis patients in a cross-sectional study (n = 120). **Results:** Compared to MTHFR CC, MTHFR TT carriers had lower mean weakly MTX dose (9.8 ± 3.3vs. 12.1 ± 3.5, p < 0.05). More MTHFR TT carriers (8/11, 73%) reported MTX-related side-effects compared to MTHFR677CC (32/57, 56%) and MTHFR677CT (30/51, 59%). No genotypic difference was found in other DMARDs. At the same dose of MTX, lymphoblasts were more sensitive in cell survival, protein and thymidine syntheses whereas HepG2 models were more susceptible to the inhibition of S-adenosylmethionine synthesis. MTHFR C677T alters protein turnover and folate mediated 1C metabolic fluxes in lymphoblasts with and without MTX. MTHFR function significantly affects transmethylation fluxes and S-adenosylmethionine homeostasis but not nucleotide biosyntheses in MTX-treated HepG2 cell-lines. **Conclusion:** Combining cell models, kinetic studies, and genetic tests in humans, this study gives insight on how MTHFR effects hepatic transmethylation homeostasis during MTX therapy. We provide platforms that help predict the genetic impact on antifolate drugs, and further delineate tissue-specific target pathway in DMARD therapies.

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Antioxidant and Anti-Inflammatory Effects of *Spiraea prunifolia* var. *simpliciflora* Extract

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Keywords: Antioxidant activity · Anti-imflammatory effect · *Spiraea prunifolia* var. *simpliciflora*
Background/Aims: *Spiraea prunifolia* var. *simpliciflora* (SP) contains salicylates, which are effective for anti-inflammation, antipyretic and analgesic effects. The purpose of this study was to investigate the antioxidative and anti-inflammatory effects of SP extract. **Methods:** The branches, leaves and stems of SP were extracted with 70% ethanol and 60% EtOH fraction by column chromatography was used as a sample. Total polyphenol content, DPPH radical and ABTS radical scavenging activities and FRAP (ferric reducing antioxidant power) value were measured. The effect of SP fraction on the production of nitric oxide (NO) and cytokines (TNF-α and IL-6) was measured in raw 264.7 cells stimulated with lipopolysaccharide (LPS). **Results:** Total polyphenol content was 148.48 GAE mg/g. DPPH and ABTS radical scavenging activities (IC50 value) were 0.7 mg/mL and 0.168 mg/mL, respectively. FRAP value was 2.298 mM. At raw 264.7 cells, the cytotoxicity of the extract was not observed up to 250 ug/mL. Compared with the LPS alone treatment group, NO production was significantly decreased (p < 0.05) from the concentration of 31.25 ug/mL in the experimental group and the inhibition rate was 96% at the concentration of 250 ug/mL. IL-6 production was signifi-

cantly decreased above 125 ug/mL (p < 0.05), and was inhibited by 44% at 125 ug/mL and 97% at 250 ug/mL. **Conclusion:** The 60% ethanol fraction of SP showed strong antioxidant and anti-inflammatory activities.

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The Effects of Jilin Sika Deer Extract Supplementation on Plyometric Performance of Free Boxing Players

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Keywords: Tendon of Jilin Sika Deer extract (TDE) · Plyometric performance · Drop jumps

Background/Aims: We demonstrated that Tendon of Jilin Sika Deer extract (TDE) supplementation in improving plyometric performance in free boxing player. **Methods:** 16 subjects wore indoor sneakers, shorts and sports bras. After pre-heating, perform 200 repeated drop jumps (DJs) tests. The subject stood on the force plate and immediately leaped up vertically with maximum force as quickly as possible. The instrumentation of kinetic and kinematic data were collected using BTS motion capture and analog data acquisition system (Bioengineering, Milano, Italy) and 4 force platforms (BTS P6000, BTS Bioengineering, Milano, Italy) at a 400-Hz sampling rate were used. A modified Helen Hayes marker set was used to identify the 7-segment rigid link model of the lower extremities. **Results:** TDE group exhibited significantly higher 200 repeated drop jumps performance compared to the placebo group (P < 0.05). **Conclusions:** We suggesting that TDE supplementation have could be further considered as potential ergogenic aids combined with different nutrient strategy to enhance exercise performance for free boxing players.

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Relationship between Circulating 16:1n-7 and Obesity and Its Underlying Mechanisms: Evidence From Obeservational Study and Rodent Model

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Keywords: Palmitoleic acid · 16:1n-7 · Obesity · Adipose function· Insulin resistance

Background/Aims: Palmitoleic acid (PLA, 16:1n-7), a monounsaturated fatty acid which was widely found in serum, adipose tissue and liver, has been considered as one novel "lipokine" that can exert metabolic effects on distant organs. However, results from epidemiological studies regarding the relationship between circulating 16:1n-7 and obesity are inconclusive, and potential effects of 16:1n-7 on metabolisms remain unclear. **Methods:** Therefore, we conducted a case-control study including 1442 obese cases and 1442 controls to investigate the association between circu-

lating 16:1n-7 and obesity in Chinese children, and used an animal model to explore the effects of dietary supplementation of 16:1n-7 on adipose tissue function and insulin resistance in high-fat-dietinduced obese mice. **Results:** We found that obese cases had lower proportions of erythrocyte phospholipid 16:1n-7 than controls (P < 0.001), erythrocyte phospholipid 16:1n-7 was found to be inversely associated with obese risk in Chinese children (highest versus lowest quartile OR = 0.47, 95% CI: 0.28, 0.79). In mice model, 32 male C57B/L6 mice were devided into 4 groups and fed with low-fat diet (LF), high-fat diet (HF), low dose of 16:1n-7 containing high-fat diet (LPLA) and high does of 16:1n-7 containing high-fat diet (HPLA) for 8 weeks. Compared with HF, mice fed with HPLA showed significantly decreased weight gain, epididymal fat index and cell cize (P < 0.05), and showed decreased gene expression of IRS-1 and GLUT-4 and increased gene expression of leptin and resistin in epididymal fat (P < 0.05), indicating that 16:1n-7 can impede adipose tissue dysfunction and insulin resistance in obese mice.

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Colonic Motility in Rats During Administration of Pectin-Containing Liquid Diet

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Keywords: Liquid diet · Pectin · Colonic motility

Background/Aims: Liquid diet (LD) containing low-methoxyl pectin has a property of gelling in the stomach. The LD showed lower incidence of diarrhea in clinical setting and promoted healing of colonic anastomosis in rats, suggesting that the pectin affects the physiological function of the lower gastrointestinal tract. The purpose of this study was to investigate the effects of pectin-containing LD on colonic contraction motility in rats. **Methods:** Regular chow (FED) and three test LDs were sequentially fed to adult male rats, and the contraction motility was recorded with a force transducer sutured to the descending colon. The area under the curve of the contraction waveform was taken as the Motility Index (MI). The three test LDs consisted of pectin-containing (EG), pectin-free (PF) and calcium and magnesium-free (CMF). Statistical analysis included Dunnett-type multiple comparison. **Results:** Fecal condition during LD feeding was either normal (EG), watery (PF), or muddy (CMF). There was no significant difference in the MI between FED and EG. Compared to FED, the MI during fasting and PF and CMF feeding was significantly lower. Compared to EG, the MI was significantly lower during PF feeding, and tended to decrease during CMF feeding. **Results:** Pectin-containing LD seemed to have similar physiological effects as solid food from the viewpoint of colonic motility. Removal of pectin or calcium and magnesium from the LD resulted in diarrhea and attenuated the colonic motility, suggesting that gelation of the undigested low-methoxyl pectin in the colon normalized the stool and caused colonic contraction by mechanical stimulation.

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Effect Of Dietary Vitamin E on Oxidative Stress-Related Gene-Mediated Differences In Anxiety-Like Behavior in Inbred Strains of Mice

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Keywords: Vitamin E · Anxiety-like behavior · Mouse strains · Oxidative stress

Background/Aims: It has been reported that the degree of anxiety-like behavior differs between inbred strains of mice, and that this phenomenon was linked to the expression levels of the oxidative stress-related genes glyoxalase 1 (Glo1) and glutathione reductase 1 (Gsr) in the brain. Therefore, we investigated whether antioxidative activity in the brain affects strain-dependent anxiety-like behavior using mice fed different amounts of vitamin E. **Methods:** First, we measured brain *Glo1* and *Gsr* mRNA levels and evaluated the anxiety-like behaviors presented by C57BL/6J (B6) and DBA/2C (D2) mice. We demonstrated that B6 mice presented both significantly elevated *Glo1* and *Gsr* mRNA levels as well as more prominent anxiety-like behavior in elevated plus-maze and open field tests. Next, we fed mice from these two strains either a control, vitamin E-free, or vitamin E-supplemented diet for four weeks. Plasma, liver, and brain α-tocopherol concentrations changed in a dose-dependent manner. However, neither brain *Glo1* and *Gsr* mRNA levels nor anxiety-like behavior were affected by dietary vitamin E intake. **Results:** Fecal condition during LD feeding was either normal (EG), watery (PF), or muddy (CMF). There was no significant difference in the MI between FED and EG. Compared to FED, the MI during fasting and PF and CMF feeding was significantly lower. Compared to EG, the MI was significantly lower during PF feeding, and tended to decrease during CMF feeding. **Results:** These results demonstrated that B6 and D2 mice are appropriate models for the analysis of strain-dependent differences in anxiety-like behavior. In addition, although the observed strain-dependent differences in anxiety-like behavior between these two strains were tightly related to the expression levels of *Gsr* and *Glo1*, the precise regulatory mechanism was found to be independent of oxidative stress and antioxidative activity in the brain. Strain-dependent differences in anxiety-like behavior are likely mediated by the GABAergic effect of methylglyoxal which was detoxified cooperatively by Gsr and Glo1.

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Capsaicin Alleviates Cisplatin-Induced Skeletal Muscle Atrophy

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Keywords: Capsaicin · Cisplatin · Muscle atrophy

Background/Aims: Cisplatin is a widely used chemotherapeutic drug which causes an array of adverse effects on different organs and tissues, including skeletal muscle weakness and cachexia. Capsaicin, is one of the major ingredients and responsible for the "hot and spicy" taste in chili peppers. It is a valuable pharmacological agent with several therapeutic applications in controlling pain and inflammation. It is reported to have therapeutic potential in muscle atrophy. However, the mechanisms underlying its protective effects on cisplatin-induced muscle damage and atrophy remain largely unknown.. **Results:** In this work we show that cisplatin behaves as a potent trigger to activate protein hypercatabolism in skeletal C_2C_{12} myotubes. Within 48 h of 40 μM cisplatin administration, C_2C_{12} myotubes displayed lower cell viability and showed a subset of hallmark signs typically recognized during atrophy, including severe reduction in myotube size and diameter, repression of Akt, mTOR phosphorylation. However, we demonstrated that administration of capsaicin can ameliorate cisplatin-induced muscle damage and atrophy by up-regulation of Akt, mTOR phosphorylation, which stimulated protein synthesis in skeletal muscle. These results suggest that cisplatin may lead to an imbalance between protein synthesis and protein degradation pathways, which would lead to muscle atrophy, then pretreat capsaicin has protective effects against cisplatin-induced muscle loss

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High Body Fat and Low Dairy Intake Contributed to Inadequate Vitamin D among Older Women in Kuala Lumpur and Selangor

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Keywords: Vitamin D · Body composition · Dietary intake · Older women

Background/Aims: The global prevalence of inadequate vitamin D among older women has been on the rise, which increases the risk of poor bone health. With the rising global temperature that reduces optimal sun exposure among older women, factors such as body composition and dietary intake become more vital in maintaining adequate vitamin D. The current study determined the contribution of body composition and dietary intake towards vitamin D adequacy among 214 older women. **Method:** Researchers measured the body weight, height, waist circumference and body fat percentage of the respondents, then interviewed them on their sun exposure and dietary intake. The serum 25-hydroxyvitamin D concentration [25(OH)D] was measured using the fasting blood sample collected from the respondents. **Results:** According to the Institute of Medicine (IOM) with the cut-off of 50.0nmol/L, approximately four out of five respondents (82.7%) had inadequate vitamin D, with an average of 37.4 ± 14.3nmol/L. Lower body fat percentage (r = –0.218, p < 0.01) and higher dairy products consumption (r = 0.146, p < 0.05) were correlated with higher [25(OH)D]. The respondents had sufficient weekly sun exposure [180.0 (60.0, 300.0) minutes], but it was not significantly correlated with [25(OH)D]. In the multivariate analysis, higher body fat percentage (b = –0.211, p < 0.01) and lower consumption of dairy products (b = 0.135, p < 0.05) contributed towards lower [25(OH)D]. **Conclusion:** In conclusion, older women with high body fat percentage and consumed fewer servings of dairy products were

factors contributed to vitamin D inadequacy. Future research is needed to determine the optimal body fat percentage and serving size of dairy products required for adequate vitamin D among older women.

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Total Phenolic, Flavonoid Content, and Antioxidant Activity of Some Indigenous Vegetables Grown in West Java, Indonesia

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Keywords: Antioxidant · Flavonoid · Indigenous vegetables · Phenolic

Background/Aims: Leaves extracts from 4 green leafy vegetables of Indonesian origin were screened for total phenolics, flavonoid content, and antioxidant activity to evaluate their potential as a source of antioxidants. **Methods:** The samples used in this study were *Bouea macrophylla* Griff., *Ocimum basilicium L.*, *Pilea melastomoides*, and *Lactuca sativa* leaves. Extraction method that used was maceration using water as solvent. Phytochemical screening was used to determine the presence of phytochemicals qualitatively. Water extract of 4 green leafy vegetables were subjected for Folin-Ciocalteu method for phenolic content, $AlCl_3$ colorimetric assay for flavonoid content, and DPPH (1,1-diphenil-2-picrylhydrazil) for antioxidant activities. **Results:** The phytochemical screening showed that all leaves extract contained polyphenols compounds, flavonoids, tannin, and saponins. *Bouea macrophylla* Griff. leaves had the highest total phenolic and flavonoid content, and antioxidant activity with 201 ± 36.17 mg GAE/g extract, 1.9 ± 0,12 mg QE/g extract, and 70 ppm of IC50 value, respectively. The higher levels of phenol and flavonoid would contribute to antioxidant activity. **Conclusion:** *Bouea macrophylla* Griff. was identified as potentially rich sources of dietary phenols, flavonoids, and antioxidants.

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Consumption of Joruk Maman (*Cleome gynandra L.*) Could Reduce Triglyceride But Not Cholesterol Levels in Hypercholesterolemic Male White Rats

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Keywords: Joruk maman · Fermentation · Probiotic · Hypercholesterolemic rats

Background/Aims: This study aimed to investigate the effect of Joruk Maman consumption on total cholesterol and triglyceride levels in hypercholesterolemic male white rats. Joruk maman was a fermented product made from young leaves and stems of maman plant (*Cleome gynandra L.*) given a mixture of salt, white rice and warm water and then stand for 24 hours before consumption. **Methods:** Twenty white male rats wistar strain (*Rattus norvegicus*) were divided into 4 treatment groups, each group consisting of 5 rats. One group for control, positive control group (induced with yolk of quail eggs (1% body weight) and propylthiouracil (10 mg/200 g body weight), comparison group (simvastatin 0.09 mg/day/200 g body weight) and treatment group (joruk maman 1.08 g/day/200 g body weight). **Results:** Joruk maman had an effect on mean cholesterol level (p < 0.001) and blood triglyceride (p < 0.001). There was significant difference on the average cholesterol level between maman fermentation group with negative control (p < 0.05) and positive control (p < 0.05). There is no significant difference between maman fermentation group and simvastatin group (p > 0.05). The average of triglyceride level was significantly different between maman fermentation group with negative control (p < 0.05), positive control (p < 0.05) and simvastatin (p < 0.05). **Conclusion:** Joruk maman showed potential effect in reducing triglyceride levels but not total cholesterol levels in hypercholesterolemic male white rats.

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A Novel Peptide Derived from Rice α-Globulin Decreased Cholesterol Micellar Solubility In Vitro and Inhibited Cholesterol Absorption in Rats

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Keywords: Rice · Cholesterol · Peptide · Bile acid

Background/Aims: It is well known that the appearance of coronary heart disease depends on the serum cholesterol level. This experiment was designed to identify the peptides which have bile acid-binding activity and inhibit the cholesterol absorption from rice α-globulin. **Methods:** In this study, we used a peptide array to evaluate the bile acid-binding activity of a peptide derived from rice α-globulin. In the peptide array, bile acid-binding ability was evaluated by the binding ability of taurocholic acid and fixed peptides on cellulose membrane, then binding peptides with taurocholic acid were detected by immunoassay. To evaluate the bile acid-binding ability and micellar solubility of cholesterol in vitro, soybean protein peptic hydrolysate (SPH) was used as a positive control and casein tryptic hydrolysate (CTH) as a negative control. Intestinal cholesterol absorption was measured in rats. **Results:** We found for the first time some bile acid binding peptides in this screening. The MRFRDR had a higher bile acid-binding ability and significantly lower cholesterol micellar solubility than other synthesized peptides or CTH in vitro. In rats, intestinal cholesterol absorption was significantly decreased by the administration of MRFRDR. **Conclusion:** We found that MRFRDR significantly decreased cholesterol micellar solubility in vitro and inhibited cholesterol absorption in rats.

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GWAS Reveals the Association between Black Tea Consumption and 12q24 Locus in Japanese Population

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Keywords: GWAS · Black tea consumption · 12q24
Background/Aims: Genome-wide association analysis (GWAS) related to the black tea consumption has not been carried out. Genomic DNA was extracted from saliva specimens of 12.247 Japanese participants and genotyped using a single nucleotide polymorphism (SNP) array. **Methods:** We divided the participants into eight groups according to the residential area, and examined SNPs related to black tea consumption using GWAS and meta-analysis. Variants with p-value $<5\times10^{-8}$ in the meta-analysis was considered as genome-wide significance. **Results:** We found a locus associated with black tea consumption at 12q24 (rs2074356, p = 2.26×10^{-8}). Having one minor allele of this SNP was associated with increased level of black tea consumption by 0.041 cups per day, that is, about 15 cups a year. The 12q24 is a strong linkage disequilibrium region including rs671, a well-known SNP related to alcohol metabolism. When adjusted for alcohol intake, the association between rs2074356 and black tea consumption was attenuated. Meanwhile, when adjusted for coffee consumption, the association was not attenuated. **Conclusion:** This study showed for the first time that 12q24 locus is associated with black tea consumption with the mediation of alcohol intake. In addition, it was suggested that the association between black tea consumption and 12q24 was independent of coffee consumption.

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Nutritional Status and Dietary Intakes of The Patients With Mild-To-Moderate Alzheimer's Disease

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Keywords: Alzheimer's Disease · Nutritional status · Dietary intakes · Micronutrients
Background/Aims: Alzheimer's disease (AD) patients are frequently reported to have reduced nutrient consumption and poor nutritional status. Although understanding their nutritional status is crucial in the treatment and care process, data is unavailable in Sri Lanka. This study aimed to investigate current nutritional status and dietary intakes of AD patients. **Methods:** Fifty mild-to-moderately cognitive impaired AD patients (Mini-mental State Examination score 12–25; 23 males; 27 females; age >65 y) were recruited from the clinics and nutritional status was assessed using Mini Nutritional Assessment (MNA) tool, and 5-day Diet diary. **Results:** According to MNA, half of the AD patients had normal nutritional status (54%), whereas others were either malnourished (4%) or at risk of malnutrition (42%). They consumed lower energy (male:1634 ± 616 kcal/day, female:1459 ± 293 kcal/day) than the recommendation. However, the percentage energy from fat, protein and carbohydrates (32.6 ± 9.5%, 12.5 ± 1.8% and 56.4 ± 9.9%, respectively) were at recommended levels and energy from saturated fat (16.8 ± 6.3%) was higher than the recommendation. Vitamin A, D, E, B6, folate, calcium, potassium and selenium intakes (371.3 ± 159 mg/day, 2.7 ± 1.6 mg/day, 4.3 ± 4.3 mg/day, 0.9 ± 0.7 mg/day, 190 ± 93.1 mg/day, 662.5 ± 383.6 mg/day, 1924.5 ± 853.1 mg/day and 29.2 ± 22 mg/day, respectively) were lower than the estimated average requirements (EAR). **Conclusion:** In conclusion, nearly half of AD patients were either malnourished or at risk of protein-energy malnutrition in consistent with lower dietary energy intakes. Low micronutrient intakes reported by AD patients suggests an intervention with a specific combination of nutrients in the form of a medical food to improve memory performance of drug-naïve patients with mild/moderate AD.

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Glycemic Index in Pasta Added with Chickpea Flour and Semolina

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Keywords: Resistant starch · Glycemic index · Legume starch · Retrograded indigestible starches
Background/Aims: The low glycaemic index of pasta can be related to its specific structureand change in pasta structure can result to a change in its starch digestibility. Drying temperature has been demonstrated that influences pasta in vitro pasta digestibility; low glycaemic index diets improve glucose tolerance in human. However, there is a need of a more diversified range of low glycaemic index foods. The object of this work was to investigate the effect of incorporation of chickpea flours as nutritional additives in pasta and evaluate the effect of chickpea flours and microwave drying on pasta starch fractions and glycemic index. **Methods:** A substitution of 20% chickpea flour was made with respect to the reference sample (100% semolina). Six pasta samples were prepared from 100% semolina, semolina (80%) and raw chickpea flour (20%), semolina (80%) and cooked chickpea flour; each sample was than subjected to traditional drying (40°C; 80% RH) and an optimized microwave drying. **Results:** Results showed a significant effect of formulation on total starch (TS), resistant starch (RS) and glycemic index (GI) while the drying method showed no significant effect. Glycemic index was lower in pasta added with chickpea flour than in semolina control pasta, reflecting the slow and low digestion of the starch in the leguminous ingredient. **Con-

clusion: Highest percentage of resistant starch was observed in pasta with cooked chickpea flour probably due to the tendency of legume starch to recrystallize upon cooling, forming retrograded indigestible starches fractions.

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Slowly Digestible Carbohydrates for Low-Glycemic Index Foods, Beverages and Supplements

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Keywords: Slowly digestible carbohydrates · Glycemic index · Gluten-free · Drink-mix

Background/Aims: In the last decade, low-glycemic index (GI) and gluten-free products have flooded the nutrition market globally. There is an impetus to innovate ingredients, food and beverages to deliver balanced energy with less variability in glycemic response. Carbohydrates impact blood glucose and are ranked using standard measurement, glycemic index. Australia is pioneer leading the efforts to develop and implement "GI symbol" as carbohydrate indicator on front-of-pack labelling of food and beverages. Low GI diets (GI <55) release glucose at a sustainable rate, providing balanced available energy, and health benefits. Slowly digestible carbohydrates (SDC) offers quality carbohydrates and are typically low in dietary fiber. SUSTRATM 2434 slowly digestible carbohydrate, is gluten-free that can be formulated into non-thermal applications including drink mixes and cold-press bars. The objective of this study was to determine the GI of the ingredient alone and powdered drink mix made with the SDC ingredient. **Methods:** In a randomized, double-blind study, heathy adults (n = 14) consumed four test drinks delivering 50 g available carbohydrates on separate days to measure GI. Participants either consumed dextrose in water, SDC alone in water, SDC drink-mix powder reconstituted in skim milk or control drink-mix reconstituted in skim milk (without SDC). Post-prandial glucose response was measured for 120 minutes. **Results:** Results indicate that SDC ingredient alone and SDC drink-mix had significantly, 27% lower GI compared to the control drink-mix. **Conclusion:** SUSTRATM 2434 slowly digestible carbohydrate is a low glycemic ingredient and is well suited for low GI product innovations.

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Effects of Turmeric on Dexamethasone-Induced Skeletal Muscle Atrophy in Vitro

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Keywords: Muscle atrophy · C2C12 · Dexamethasone · Turmeric

Background/Aims: Muscle atrophy progresses with aging. One of the effective means to improve skeletal muscle atrophy is exercise. However, it is difficult for elderly people to exercise regularly. Therefore, dietary intervention is expected to prevent skeletal muscle atrophy. Various physiological activities have been reported for turmeric although the effect of turmeric on muscle atrophy is still unknown. The aim of this study is to examine the effect of turmeric on skeletal muscle atrophy in vitro. **Methods:** C2C12 cells supplemented with synthetic glucocorticoid dexamethasone (DEX) were used as a model of muscle atrophy. After a 6-day differentiation process, the extract of turmeric (Curcuma longa, TE), and bisacurone, one of the components of TE, were added. At the same time, muscle atrophy was induced by 12-hour DEX administration. The gene expression and protein level of DEX-inducible skeletal muscle atrophy related ubiquitin ligases, i.e. Muscle atrophy F-box (Mafbx) and muscle RING finger-1 (Murf 1) were measured by real-time PCR and western blotting analyses, respectively. Moreover, myotube diameter was analyzed using a microscope and determined with image. **Results:** JTE significantly lowered the expression of Mafbx and Murf1, as well as the protein level of MAFbx and MuRF1. Decrease of Murf1 level and its protein level was observed by bisacurone addition. Furthermore, the myotube diameter was significantly recovered in TE and bisacurone groups compared to the DEX group. Therefore, TE may have inhibitory effect on skeletal muscle atrophy, of which one of the active components might be bisacurone.

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***Kaempferia parviflora* Improve Glucose Intolerance and Fat Accumulation in Type-2 Diabetic Model Mice**

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Keywords: *Kaempferia parviflora* · PPARγ · Glucose tolerance · Fat accumulation · Nagoya-Yasuda-Shibata mice

Background/Aims: We have showed that Kaempferia parviflora (black ginger, BG) and its ethanol extract (BGE) had PPARγ agonistic activities in a ligand-binding study. As possible compounds to represent PPARγ agonistic activity, 5,7-dimethoxyflavone, 5,7,4-trimethoxyflavone, 3,5,7-trimethoxyflavone, and 3,5,7,4-tetrathoxyflavone are contained at a higher level in the BGE. **Methods:** In this study, we firstly investigated the dietary effect of BG (1% in high-fat diet) and BGE (0.19%) on glucose tolerance in non-obese and type-2 diabetic Nagoya-Shibata-Yasuda male mice for 8 weeks. At the end of the 8 weeks, oral glucose and insulin tolerance tests (OGTT and ITT) were respectively carried out. In OGTT and ITT, plasma glucose level was improved by the BG and BGE. These effects were equivalent to those of pioglitazone (3 mg/kg/day), a PPARγ agonist. In addition, body weight gain, adipose and ectopic fat accumulations were strongly suppressed by the dietary BGE through the improvement of fat metabolism. We also investigated the anti-diabetic mechanism of BGE by using BADGE, a PPARγ antagonist. NSY mice supplemented with BGE (0.19% in high-fat diet) and BADGE (30 mg/kg/day) were prepared and treated in the same way as the previous study. **Results:** The combination of BGE and

BADGE additively improved glucose intolerance, adipose and ectopic fat accumulation, and body weight gain. These results indicated that the improvements of diabetes and ectopic fat accumulation by the dietary BGE were not limited to the PPARγ activation. **Conclusion:** In conclusion, ethanol extract from Kaempferia parviflora can be effective for prevention of insulin resistance and type-2 diabetes.

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The Effects of Milk Casein Hydrolysate and Its Derived Peptides on Glucose Metabolism in C2C12 Skeletal Muscle Cells

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Keywords: Milk casein hydrolysate · C2C12 · AMPK
Background/Aims: Improvement of glucose metabolism in skeletal muscle suppresses exercise-induced fatigue and contributes to health promotion. Previously, we have shown that intake of milk casein hydrolysate (MCH) improves glucose metabolism in humans, although the mechanism is unclear. In this study, we aimed to investigate the effect of MCH and its derived peptides on glucose metabolic signaling in cultured skeletal muscle cells. **Methods:** C2C12 myoblasts were differentiated for 96 h after growth until the cells achieved confluence, and the confluent cells were used in each experiment. Experiments using MCH and MCH-derived peptides, Val-Pro-Pro (VPP) and Ile-Pro-Pro (IPP) were carried out after 4-hour incubations in unsupplemented medium. The rate of 2-deoxy-glucose (2-DG) uptake and phosphorylation levels of insulin-independent signaling factors were examined. **Results:** The rate of 2-DG uptake was significantly higher in both MCH and IPP conditions than in the control condition (P < 0.05). In immunoblotting assays, the phosphorylation levels of AMP-activated protein kinase (AMPK), a rate-limiting factor in the insulin-independent signal, and liver kinase B1, an upstream factor of AMPK, were significantly higher in both MCH and IPP conditions than in the control condition (P < 0.05). **Conclusion:** These results suggested that MCH enhanced glucose uptake with activated insulin-independent signaling in skeletal muscle cells, which might be mediated by a MCH-derived peptide IPP.

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Effect of Short Term Probiotics With and Without Co-Administration of Omega-3 Fatty Acids on Immunity Among Physically Active Individuals

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Keywords: Probiotics · Omega-3 fatty acids · Immunoglobulin A (IgA) · Upper respiratory tract infections
Background/Aims: Highly active individuals, due to excessive inflammation, have lower levels of immunoglobulin A (IgA) involved in host defence mechanism in the mucosa. Lowered IgA levels may compromise defence and increase susceptibility to develop upper respiratory tract infections (URTI). While probiotics are known to improve mucosal immunity, their synergistic effect with anti-inflammatory omega 3 fatty acids (Omega3 FA) is currently unknown. Hence the present study examines the effect of four weeks' probiotics supplementation with and without Omega3 FA on incidence of URTI and salivary IgA levels among competitive swimmers and regular gym users. **Methods:** Using block randomization, 29 individuals were randomised to receive either one bottle of culture drink contains Lactobacillus casei Shirota strain with 3.75×108 colony forming units daily (n = 15) or a combination of Lactobacillus casei Shirota with 3 capsules containing 650 mg of Omega3 FA each (n = 14). URTI incidence was recorded via a questionnaire on incidence, severity and duration of illness. Saliva samples were collected at baseline and end of study and salivary IgA analysed via immunoassay kits (Novateinbio, MA). **Results:** Post-intervention, only the probiotics group showed a significant increase in salivary IgA level from baseline (4.8 ± 0.8 vs. 10.5 ± 7.7 mg/ml; p-value = 0.001). Nevertheless, the incidence, duration and frequency of URTI was observed to decrease significantly in the probiotic with Omega3 FA group (p-value = 0.008). These changes were not significantly different between groups. **Conclusion:** Short-term consumption of probiotics and Omega3 FA may have protective effects in modulating immune response against URTI.

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Analysis of the Function of Bitter Taste Receptors TAS2R in Extraoral Tissues in Mice

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Keywords: Bitter taste · TAS2Rs

Background/Aims: TAS2Rs are members of GPCR family and encoded by distinct 25 and 35 genes in human (TAS2Rs) and mice (Tas2rs), respectively.Therefore, Tas2rs have been thought to exhibit distinct functions within the respective tissues in which they are expressed. **Methods:** We comprehensively measured mRNA levels of all 35 mouse T2Rs in several organs and cultured cells, and compared their expression levels.Total RNA isolated from tissues of the tongue, liver, small intestine, kidney, lung, stomach, testis, brain of C57BL/6NCrSlc mouse (8 to 12 weeks old, male, female) and cell line of mouse microglia (MG6), macrophages (RAW264.7) and Leydig cells (I-10).The levels of mRNA of 35 mTas2r were determined by qRT-PCR to determine whether the mTas2r signaling pathway was functional in RAW264.7 cells, so we detected the change of intracellular Ca2+ after the treatment of quinine-HCl. RAW264.7 cells were treated with the media containing lipopolysaccharide (LPS) and quinine-HCl.The mRNA levels of inflammatory cytokine were determined using qRT-PCR. **Results:** The present investigation revealed that the level of mTas2r103 expression in the testis was tended to be higher than in the tongue; and that of mTas2r 126 in the lung, and mTas2r 137 in the liver were tended to be higher than other organs.It was also shown that mTas2rs were expressed in peripheral macrophages and RAW264.7 cells. Furthermore, quinine-HCl, a ligand of mTas2rs, induced an increase in intracellular Ca^{2+} in RAW264.7 cells, suggesting the possibility that the bitter taste receptors might have functions in this cell line, and this was actually proven that quinine-HCl suppressed LPS-induced inflammatory cytokines expression.

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The Association between Coffee Consumption and Cognitive Functioning

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Keywords: B-PROOF · Coffee consumption · Cognitive functioning · Elderly

Background/Aims: Cognitive functioning tends to deteriorate in the elderly. Its impairment is altered by factors such as age, gender and lifestyle factors. The association of coffee consumption on better cognition remains questionable. To study the association between coffee consumption and cognitive functioning in Dutch elderly in the B-Vitamins for Prevention of Osteoporotic Fracture (B-PROOF) study. **Methods:** Coffee consumption was assessed by the Food Frequency Questionnaire (FFQ). The participants' basic characteristics and lifestyle were also monitored. While cognitive functions were measured by several standardized tests. The association between coffee consumption and cognitive functioning were measured by hierarchical multiple linear regression. Chisquare analysis and Mann-Whitney analyses used to assess baseline characteristics interchangeably. **Results:** In this sample of community-dwelling elderly, almost half of the participants had a moderate coffee consumption (47.5% drank 2–3 cups/day and 41.6% drank ≥4 cups/day). With respect to such consumption and consider all possible risk factors: coffee consumption was not related with better performance on 4 of 5 cognition domains evaluating global cognitive function, attention and working memory, information processing speed as well as executive function. However, a borderline positive association was observed in episodic memory domain (β = 0.302, p = 0.077). The observed coffee-cognitive function association was significantly altered by age, gender and education level. **Conclusion:** No firm conclusion can be drawn directly of coffee consumption influence on cognitive function. However, positive result emerging from this study might enable the elderly to improve their cognition ability, especially in the performance of episodic memory.

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Identification of a Dietary Pattern Associated with Lower High Molecular Weight Adiponectin in Breast Cancer Survivors

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Keywords: Dietary patterns · Energy density · Saturated Fat · Fibre · HMW Adiponectin · Breast Cancer · Survivors

Background/Aims: Energy dense, high saturated fat, low fibre diets may contribute to obesity in breast cancer survivors, however their relationships with high molecular weight (HMW) adiponectin are unclear. We examined associations between an 'energy-dense, high saturated fat and low-fibre' dietary pattern (DP) and HMW adiponectin in breast cancer survivors. **Methods:** Data was obtained from 96 participants in the East Coast of Peninsular Malaysia Breast Cancer Survivors Study. Dietary intake, anthropometric and HMW adiponectin were measured and z-scores for an 'energy dense, high saturated fat and low fibre' DP were estimated using reduced rank regression (RRR). Associations between DP z-scores and HMW adiponectin were examined using regression models. **Results:** The results of this study show that, a 1 unit increase in DP z-score was associated with a 0.41 μg/mL lower HMW adiponectin (95% CI: −0.806, −0.014) independently of age, BMI, cancer stage, duration since diagnosis, education level and occupation status. The 'energy dense, high saturated fat and low fibre' DP which was characterized by high intake of sugar sweetened beverages and fat-based spread while lower intake of fruits and vegetables were further examined to find which food groups contributed significantly to the association. Interestingly no significant findings were found supporting that totality of the diet provides more accurate description of actual dietary exposure. **Conclusion:** As a conclusion, 'energy dense, high saturated fat, low fibre' DP is negatively associated with HMW adiponectin. This finding could serve as a basis in examining the relationship between dietary exposure, obesity and cancer survivorship.

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Effect of Black Tea Extract Consumption on Psychological Stress

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Keywords: Black tea · Psychological stress · Autonomic nervous activity · Parasympathetic nervous system

Background/Aims: Relieving or reducing stress in the early stage is imperative to maintain a healthy psychological state and prevent the advent of some adverse diseases. In this study, investigated the effects of black tea extract ingestion on the psychological stress in healthy Japanese subjects. **Methods:** A randomized, placebo-controlled, double-blinded, crossover trial was conducted in healthy Japanese subjects who were under psychological stress. Subjects (n = 21) were randomly assigned to either a black tea extract group or a placebo group, with each member in both groups consuming appropriate capsules. Each intervention lasted for 3 weeks with 2 weeks of the washout period. This study conducted stress-related subjective symptom surveys using the Profile of Mood States 2nd Edition (POMS 2) and Likert scale during the period of black tea extract capsules and placebo capsules consumption. Furthermore, we assessed the low frequency component (LF), high frequency component (HF), LF/HF ratio. **Results:** Black tea intake tended to be lower LF/HF ratio than those in the placebo intake. Black tea intake indicated significantly lower tension–anxiety than those in the placebo intake (p < 0.05). **Conclusion:** This study suggests that the consumption of black tea extract for 3 weeks could modulate the automatic nervous system and ease tension and anxiety.

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Prevalance of Masked Obesity Associated With Lifestyle-Related Habits, Eating Habits, and Energy Metabolism in Japanese Females

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Keywords: Masked obesity · FFM · Exercise habit · Energy metabolism

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Socio-Demographic Background and Dietary Practices were Associated with Cognitive Performance in a Sample of Primary School Children in a Selected District in Johor State, Malaysia

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Background/Aims: While there were limited studies focused on the associations of dietary practices with cognitive performance among children, the present study aims to determine the associations of socio-demographic background and dietary practices with cognitive performance among Malaysian school-aged children. **Methods:** There were 627 pairs of children and their parents from six selected primary schools in Batu Pahat district of Johor state had participated in the present study. Data on the socio-demographic background was completed by the parents, while children completed the Eating Behavior Questionnaire. The cognitive performance was assessed using the Raven's Colour Progressive Matrices (RCPM). **Results:** The mean cognitive performance score of the children was 88.9 ± 15.3, with more than one-third (36.4%) of them had average cognitive performance. While about half of the children (56.1%) skipped at least one main meal, a majority of them (97.4%) snacked between meals daily. The bivariate results showed that higher household income, higher parental education attainments, practiced meal skipping and snacking behaviors and less frequent food consumption at western fast food restaurants were significantly correlated with better cognitive performance ($p < 0.05$). The multivariate analysis revealed that higher household income ($\beta = 0.215$), higher parental education attainments ($\beta = 0.090$), practiced meal skipping ($\beta = -0.190$) and snacking behaviors ($\beta = -0.151$) were significantly contributed towards better cognitive performance ($R2 = 0.132, F = 23.599, p < 0.05$). **Conclusion:** In conclusion, better socio-demographic background and healthier dietary practices were associated with better cognitive performance of the children. Hence, future health programs are suggested to promote healthy eating in improving their cognitive performance while considering the differences in socio-demographic background of the children.

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Effects of Tea Seed Oil Combined Inulin on Hepatic Steatosis and Gut Microbiota in High-Fat Diet with Sucrose Water-Fed Mice

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Keywords: Teaseed oil · Inulin · Gut microbiota · Hepatic steatosis

Background/Aims: This study aimed to determine the effects of tea seed oil combined inulin on the hepatic steatosis and gut microbiota in a high-fat diet with sucrose water-fed mice. **Methods:** C57BL/6J male mice divided into five groups (n = 5). Control group (C) fed with standard diet, high fat-soy bean oil (S), high-fat tea seed oil (T), high-fat-soybean oil plus inulin (IS) and high-fat-tea seed oil plus inulin (IT) groups. The high-fat diet adjusted the oil content to 16% (w/w) and added 10% inulin into high fiber diet. All animals drank 10% sucrose water during the experiment period. After eight weeks, all mice were sacrificed and collected blood and tissue samples for analysis. **Results:** The serum cholesterol level was lower in the IS and IT groups. Blood triglyceride concentration in IT were significantly lower than T groups. In the T group, the hepatic lipid accumulation was the highest, but the lipid accumulation in the IS and IT groups were lower than T groups. At genus level, the relative abundance of Bifidobacteria and Bacteroides in both inulin groups was increased. Interestingly, the abdominal fat in IT group was significantly less compared to T group, but not shown in IS group compared to S group. **Conclusion:** The results indicated that combined with tea seed oil and inulin diet may reduce serum TG, diminish hepatic lipid accumulation, may prevent the growth of abdominal fat and improve the gut function by increasing the abundance of Bifidobacteria and Bacteroides in high-fat diet sucrose water-fed mice.

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Prospective Randomized Controlled Pilot Study on the Effects of Almond Consumption on Sebum and Wrinkles

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Keywords: Almond consumption · Skin health · Wrinkle reduction

Background/Aims: Almonds are a rich dietary source of fatty acids and supplementation significantly modulates serum lipid profiles. Modulation of the skin barrier improves several skin features including wrinkles, and the effects of almond on the skin's lipid barrier and on the appearance of wrinkles have not yet been elucidated. **Methods:** A prospective, randomized controlled study was conducted at UC Davis in which 31 postmenopausal female subjects (Fitzpatrick skin types I and II) were enrolled to consumed 20% of their daily energy consumption in either almonds or a calorie-matched snack for 16 weeks. Photographs and skin biophysical measures were obtained. **Results:** The almond group had significantly decreased wrinkle severity and width compared to the control group at the 16-week time point (P < 0.02). There were no significant changes in the skin barrier function measured by the Trans Epithelial Water Loss (TEWL) at 16 weeks (P = 0.65). This randomized controlled trial demonstrates that daily almond consumption may reduce wrinkle severity in postmenopausal females to potentially have natural anti-aging benefits.

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Nutrient Composition and Glycaemic Response of Rice and Bambangan (Mangifera Pajang) Meals

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Keywords: Bambangan · Mangifera pajang · Plycaemic response · Nutrient composition

Background/Aims: Bambangan (*Mangifera Pajang*), a type of wild mango in East Malaysia (Sabah) is traditionally pickled and commonly eaten with rice and fish/chicken. The nutrient composition and glycaemic response of this meal and how it compares to a meal with cooked bambangan (popular non-traditional recipe) which is potentially higher in fat is of health interest. The objectives of this study were to determine and compare the nutrient composition and glycaemic response (GR) of two meals: 1) rice, chicken and pickled bambangan and 2) rice, chicken and cooked bambangan. **Methods:** A common recipe for each meal was obtained through qualitative study. These recipes were used as standard recipes in GR trials. Nutrient composition was determined using standard AOAC methods. The GR testing protocol was in line with recommended methods and used a random, cross-over design. Fasting and postprandial capillary blood glucose were measured in GI trials. Incremental area under the curve (iAUC) for blood glucose was calculated using the trapezoidal method. **Results:** Study results showed that cooked bambangan contained higher amounts of protein, fat and dietary fibre than pickled bambangan. The GR of the rice, chicken and pickled bambangan meal was 14% lower than the GR of the rice, chicken and cooked bambangan meal but this was not statistically significant (t-test; $p > 0.05$). Both meals were classified as medium GI meals. In conclusion, the rice meal with traditional pickled bambangan and cooked bambangan, respectively, differed in nutrient composition but were comparable in their effect on blood glucose levels after consumption.

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Antidiabetic Effect of *Colocasia esculenta* (L.Schoot) Leaf Extract in High-Sucrose-Fat-Fed Rats

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Keywords: *Colocasia esculenta* · Diabetes · Blood glucose · Aldose reductase

Background/Aims: Diabetes Mellitus (DM) in the world has reached 382 million in 2013, expected to rise to 592 million by 2035. Decreasing of blood glucose and inhibition aldose reductase is a key point of diabetes treatment and prevention of complications in diabetes. *Colocasia esculenta* (CE) leaf is one of Indonesian vegetables which have inhibitory aldose reductase activity. **Methods:** This research was a true experimental study with post test only group design. 21 male Sprague dawley rat divided into: K (control groups), P1 (200 mg/KgBW) and P2 (400 mg/KgBW). Rats were induced to become obese with High Fat Sucrose Diet (HFSD) for 4 weeks then extract colocasia esculenta were given for 3 weeks. The data analyzed with the independent t Test. CE have significance effect to decrease blood glucose but have no significance effect to aldose reductase. **Results:** The results of this research found that mean blood glucose of control was 153.71 ± 8.19; treatment group 1 (P1) was 122.67 ± 20.14; and treatment group 2 (P2) was 120.67 ± 25.06. There was significant decrease of blood glucose($p < 0.05$). The mean of aldose reductase of treatment group lower than control group, however there was no significant difference ($p > 0.05$) between the groups. 200 mg/kgBW and 400 mg/kgBW dose of CE could decrease of blood glucose significantly. **Conclusion:** *Colocasia esculenta* leaf extract may be of supportive treatment to combat diabetes and diabetes complications.

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Study of Proximate Analysis, Taurin Content and Toxicity in Meal and Extraction of Mudskipper (*Periophtalmodon schlosseri*) in Southeast Sulawesi

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Keywords: Mudskipper · Taurine · Toxicity test

Background/Aims: This study aimed to analyze the proximate value, taurine content, and toxicity in ethanol extract and mudskipper meal. **Results:** Based on the analysis of the proximate content, it was found that the water content of extract and mudskipper meal were 28.17 ± 0.37 and 8.03 ± 0.21 respectively. Ash content was 9.29 ± 0.11 and 5.30 ± 0.24 respectively. Fat levels were 3.62 ± 0.17 and 5.46 ± 0.28. Protein content was $48.84\% \pm 1.12$ and $61.67 \pm 0.33\%$ respectively. Carbohydrate levels were 10.09 ± 1.08 and 19.53 ± 0.70, respectively. The level of taurine an extract of mudskipper was 1497.59 mg/l, while in flour it was 3490.81 mg/l. Based on the results of the separation of the fish body it was known that the taurine level in the head was 145.68 mg/ 100 g, on the skin was of 202.74 mg/ dl, in meat 1225.01 mg/ 100 g, in the stomach contents of 261.02 mg/ 100 g. The extract in toxicity testing showed an LC50 value of 70.97 ppm, while in flour it was 95.71 ppm. **Conclusions:** Thus, ethanol extract and mudskipper meal have the potential for toxicity. However, when each part of the fresh mudskipper was separated between the head, skin, meat and stomach contents, the values of each LC50 were 28.82, 17.85, 1109.03 and 812.63 ppm. Thus, the head and skin of mudskipper were very toxic, stomach contents are toxic while mudskipper meat is not toxic to Artemia salina Leach larvae. It is recommended to continue the research by doing several treatments in an effort to eliminate or reduce toxicity and isolate the active compounds that are toxic.

Dietary Intake of Various Food Groups and Nutrients Associated with Frailty among Older Adults

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Keywords: Dietary intake · Older adults · Frailty

Background/Aims: The epidemiological and demographic transition of increased life expectancy of population is associated with the burden of several age-related disorders including frailty. Aging process is multifactorial where nutrition plays a vital role. However, the association between dietary intake and the risk of frailty among older adults has seldom received the attention in India. To assess the prevalence of frailty among older adults using the Fried frailty phenotype criteria and to associate the risk of frailty with their dietary intakes. **Methods:** This community-based cross-sectional study involved 125 older adults aged ≥60 years residing in Hyderabad city, India. A three 24-h dietary recall was obtained to assess the dietary intakes. Frailty indicators like weight loss, low physical activity, exhaustion were assessed using a questionnaire; handgrip strength by Jamar dynamometer and gait speed by a walk-test. **Results:** Among the study participants, 25% were frail and 75% were non-frail. The prevalence of frailty increased with age, more so in women. Lower educational status (p < 0.001) and income (p < 0.001) were associated with frailty. Median intakes of cereals/millets (p = 0.001), pulses/legumes (p < 0.001), green leafy vegetables (p = 0.004), nuts/oilseeds (p = 0.003), fruits (p = 0.008), and fats/oils (p < 0.001) and all the nutrients (p < 0.05) (except vitamin-B12) were significantly low in the frail group. The prevalence of frailty was observed to be higher in the lowest tertile of most of the food groups and nutrient intakes compared to highest tertile. **Conclusions:** The study highlights that poor nutritional intake is a risk factor for frailty among older adults and need to choose healthy foods and practice dietary diversity for healthy aging.

Fructose-Induced Non-Alcoholic Fatty Liver Disease (NAFLD) Affects B-Group Vitamin Metabolism in Rats

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Keywords: Vitamins · Fructose · Fatty liver · Urine

Background/Aims: Non-alcoholic fatty liver disease (NAFLD) is the common chronic liver disease and is a major indicator of metabolic syndrome. The liver is situated in the center of the nutrient metabolism and plays an important role in store of B-group vitamins. Therefore, liver dysfunction by NAFLD is considered to affect the nutritional status of B-group vitamins. However, there is little report to examine the nutritional status of B-group vitamins in NAFLD. In the present study, we comprehensively investigated the effect of fatty liver on B-group vitamin status in rat models. **Methods:** Male Wistar rats (3 weeks old) were fed a control diet, a high fructose diet or a high fat diet for 10 weeks. The B-group vitamin contents in liver, blood and urine were measured by HPLC and microbiological methods. **Results:** Liver weight, hepatic triglyceride and plasma glucose were significantly increased in rats fed high fructose diet (p < 0.05). In blood, the content of pyridoxal (PL) was increased and the content of pyridoxal phosphate (PLP) was decreased in high fructose or high fat diet-fed rats (p < 0.05). Urinary excretion of thiamin, folate, and pantothenic acid were decreased in rats fed high fructose diet (p < 0.05). **Conclusions:** These results indicated that fructose-induced NAFLD affected the metabolism of B-group vitamins, and the effects were different with each vitamin.

Effects of Linseed Components on Metabolic Parameters in Rats Induced Metabolic Syndrome

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Keywords: Metabolic syndrome · Linseed · Lignan · Functional food

Background/Aims: Modest changes in dietary intake can delay the onset of metabolic disorders. Linseed is a widely available source of plant lignans and dietary fibre that could be used as a functional food. Therefore, we evaluated the effects of linseed components on metabolic parameters in diet-induced metabolic syndrome in rats. **Methods:** Male Wistar rats were fed with corn-starch diet (C) or high-carbohydrate, high-fat diet (H) diet and divided into eight groups for 16 week feeding with; C, H, C with raw linseed (RL), defatted linseed (DL) or secoisolariciresinol diglucoside (SDG) for last 8 weeks (CRL, CDL or CSDG) or H with RL, DL or SDG for last 8 weeks (HRL, HDL or HSDG). Doses of defatted linseed and SDG were similar to the amounts in 5% raw linseed. Parameters assessed included cardiovascular structure, blood pressure, diastolic stiffness and collagen deposition; metabolic parameters including body composition, blood glucose and cholesterol concentrations, and liver structure and function. **Results:** Supplementation of lignan or defatted linseed in H diet for eight weeks lowered body weight gain, total fat mass and improved cardiovascular function, whereas raw linseed increased adiposity with no changes in other metabolic markers except for reduced systolic blood pressure. **Conclusions:** Lignan and defatted linseed reduced the symptoms of metabolic syndrome. However, raw linseed produced minimal responses possibly due to lack of digestion of raw linseed in the rat intestine, so that the nutritional benefits of the components are unable to be realised.

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Effect of Different Cooking Methods on Starch Composition, in Vitro Digestibility and Estimated GI of Selected Brown Rice

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Keywords: In vitro · Starch digestibility · Enzyme inhibition · Glycaemic response · Cooking methods

Background/Aims: Rice is the most important cereal crop where it plays an important role in meeting energy and nutrient requirements for Asians. The glycemic index (GI) of food is contributed by different contents of amylose, amylopectin, resistant starch (RS) and total starch (TS) content. However, limited studies are available on how cooking methods affect various starch components and its digestibility. Hence, this study aimed to compare the in vitro digestibility, α-amylase and α-glucosidase inhibitory capacities and the estimated GI of cooked brown rice (CBR) using conventional rice cooker and draining methods among healthy Malaysian adults. The estimated GI was done based on the hydrolysis index. **Results:** The results showed that both amylose (48.96 ± 0.13 g/100 g, p < 0.001) and amylopectin (67.52 ± 1.36 g/100 g, p = 0.002) content in CBR from rice cooker were higher than the draining method. However, the RS content in CBR from rice cooker (0.74 ± 0.13 g/100 g) and draining method (0.75 ± 0.13 g/100 g) were not significantly different (p = 0.871). The TS content in cooked brown rice was significantly lower (p < 0.001) in rice cooker compared to draining method. The in vitro starch digestibility was lower for brown rice cooked with draining method. The enzyme inhibitory activities of brown rice were higher in the draining method. The estimated GI was 78.08 and 76.48 for rice cooker and draining methods, respectively. **Conclusions:** It is recommended that draining method of cooking the brown rice may be effective for control of post-prandial blood glucose. This may be helpful for controlling the blood sugar levels among diabetic patients too.

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Optimization of Extraction Conditions for Anti-Skin Aging Activities of *Rosa gallica* Petals

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Keywords: Middle-aged and elderly people · low body weight · Dietary · Lifestyle

Background/Aims: Herein, we suggested the optimized extraction condition of *Rosa gallica* petals for industrial application. The solvents for the extraction were varied and the anti-oxidative activity and total flavonoids content were measured. According to the result, 50% EtOH extract revealed the highest anti-oxidative effect and total flavonoid. We previously reported the anti-inflammatory activity of the extract of *Rosa gallica* petals on skin. Because the underlying mechanism of inflammation and skin aging process is closely linked, we thought that the extract of *Rosa gallica* petals possesses anti-skin aging activity. Indeed, we found that the extracts from *Rosa gallica* petals showed the suppressing activity on melanin production and matrix metalloproteinase-1 (MMP-1), a hall mark for wrinkle formation. **Results:** We analyzed the anti-skin aging activity of the extracts which obtained by varying extraction solvents. Interestingly, most of the extracts represented anti-skin aging activity, and the sUV-induced MMP-1 expression was significantly decreased in 50% EtOH extract among the extracts. This result is in accordance with the result of anti-oxidative and total flavonoids content. **Conclusion:** Overall, we found the anti-skin aging effect of the extracts from *Rosa gallica* petals and suggested 50% EtOH extraction is optimized condition for the highest anti-aging, -oxidative and total flavonoids content among the other extraction solvents.

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Antioxidant Potential of Gandaria Leaf as Beverage With Different Processing

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Keywords: Gandaria leaf · Antioxidant · Phenolic

Background/Aims: Gandaria leaf are used by some people as herbal remedies. Processing that often used on gandaria leaf as herbal remedies was processed as beverage. Nowadays research about effect of gandaria leaf processing method to antioxidant potential is limited. This study examined the effect of processing gandaria leaf as juice, fresh leaf decoction (FLD), roomdried leaf decoction (RLD), and sundried leaf decoction (SLD) to IC50, phenolic total, flavonoid content, and vitamin C. **Methods:** This research is an experimental laboratory with 3 replicates duplo. Spectrophotometry was used for analysis IC50, total phenolic compound, and flavonoid content, while vitamin C used titration. **Results:** The best IC50 inhibition results were preceded by juice 0.27 ± 0.02 µl, FLD 0.82 ± 0.16 µl, RLD 0.85 ± 0.29 µl, SLD 1.80 ± 0.78 µl. In 100 ml the highest total phenol sample solution was FLD 561.60 ± 67.15 mg GAE, juice 227.42 ± 2.96 mg GAE, RDL 217.30 ± 13.908 mg GAE, SDL 215.78 ± 3.7 mg GAE. Total flavonoid in 100 ml FLD 75.36 ± 0.39 mg QE, RLD 13.25 ± 2.43 mg QE, juice 9.933 ± 1.95 mg QE, and SLD 4.91 ± 0.11 mg QE. Vitamin C levels in 100 mL sample solution FDL 75.36 ± 0.39 mg, RDL 74.91 ± 0.00 mg, juice 74.31 ± 0.00 mg, and SDL 74.12 ± 0.34 mg. **Conclusions:** Based on the results, gandaria leaves have the best potential as an antioxidant with IC50 in juice, the highest phenol in FLD, the highest flavonoids in FLD, and vitamin C in FLD. Further research is needed to find the potential for high-phenolic components such as antidiabetic potential.

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Effect of Folic Acid and Vitamin B6 on Cytophysiology of Human Normal Esophageal Epithelial Cells Exposed to Microcystin-LR

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Keywords: Esophageal cancer · One-carbon unit metabolism-related B vitamins · MC-LR·Human normal esophageal epithelial cells

Background/Aims: The purpose of this experiment was to investigate the effects of folic acid and vitamin B6 on human normal esophageal epithelial cells (HEEC) exposed to Microcystin-LR (MC-LR), and observe their effects on cell proliferation, cell cycle, apoptosis, P53, P16 mRNA expression and protein levels. **Methods:** We used 0.00005 μg/mL MC-LR to infect HEEC, and different concentrations of folic acid and vitamin B6 were added to intervene. CCK8 was used to detect cell viability. Reverse Transcription-Polymerase Chain Reaction (RT-PCR) was used to detect P16 and P53 mRNA. The expression of P16 and P53 protein was determined by Western Blot. **Results:** The addition of 200 μg/mL folic acid and vitamin B6 inhibited the proliferation of nHEEC compared with the MC-LR model group. Compared with the control group, the cell apoptosis rate decreased, the proportion of S phase cells increased, the expression of P16 and P53 mRNA and protein were down-regulated after 0.00005 μg/mL MC-LR treatment for 24 h. After vitamin B6 intervention, compared with the MC-LR model group, the level of apoptosis increased, the proportion of cells in S phase decreased, and the expression of P16 and P53 mRNA and protein were up-regulated. **Conclusions:** The study suggested that low dose of MC-LR can promote the proliferation of HEEC and inhibit apoptosis. Folic acid and vitamin B6 can inhibit the proliferation of HEEC exposed to MC-LR treatment. This work was supported by the National Natural Science Foundation of China (No. 81673147, 81372985) and the Fundamental Research Funds for the Central Universities (No. 2242017K40035)

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Hydrolysates from Fractionated Rice Bran Protein and Their Potential as Anti-Inflammatory Agent

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Keywords: Rice bran protein · Fractionation · Hydrolysate · Antioxidative activity · Immune modulation

Background/Aims: Rice bran was generally used as animal feed, while it contains many health beneficial compounds. With hydrolysis reaction, small peptides could be obtained from rice bran protein, in which it showed high antioxidative activity. Immune modulating and antioxidative activity of rice bran protein hydrolysates from fractionated rice bran were studied. **Methods:** Albumin, globulin, glutelin and prolamin proteins were fractionated by the mean of difference in solubility and hydrolyzed with two types of enzyme, pepsin and protease M. Albumin fraction showed high degree of hydrolysis in both enzymes. Protease M differently digested rice protein fractions, in which it showed low digestion towards glutelin and prolamin fractions. After 30 min of hydrolysis time, the reaction slowed down and antioxidant activity remained constant in pepsin hydrolysis. Due to high contamination of lipopolysaccharide (LPS) in proteaseM digested fractions (caused by the enzyme), thus they could not be tested immune modulating activity. **Results:** THP-1 macrophages were simultaneously stimulated with 100 ng/ml LPS and rice bran protein hydrolysates from pepsin digestion. Albumin hydrolysate at 0.5 hr digestion reduced the secretion of pro-inflammatory cytokine (IL-1β), while crude rice bran protein (non-fractionated) hydrolysate at 4 hr digestion could 2-fold increased secretion of anti-inflammatory cytokine (IL-10). **Conclusions:** Thus, pepsin digested rice bran protein could be potentially used as anti-inflammatory compound.

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Comparative Effects of EPA and DHA on Ulcerative Colitis in Mice

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Keywords: EPA · DHA · Ulcerative colitis · DSS

Background/Aims: The effect of EPA and DHA on dextran sulphate sodium (DSS)-induced ulcerative colitis (UC) in mice was investigated. **Methods:** Different doses of EPA and DHA were administered by gastric gavage for 1 month. UC was then established by drinking water containing 2% DSS. Body weight, stool consistency and bleeding of mice were recorded daily to evaluate the disease activity index (DAI) of UC dynamically. The length of the colon was measured. The infiltration of inflammatory cells in distal colon was evaluated using H&E staining. Western blot was used to explore the expressions of inflammation related genes. **Results:** EPA significantly blocked the DSS-induced weight loss, decreased DAI and edema grade in mice, whereas DHA did not. The infiltration of inflammatory cells in colon was markedly reduced, while levels of the chemokine MCP-1 and the marker of neutrophils and macrophages such as MPO, F4/80 were significantly reduced in EPA-treated group. In addition, inflammatory pathways including IL-6/Stat3, TLR4/NF-κB, TNF-α/NF-κB, NLRP3/IL-1β were also down-regulated by EPA intervention. Moreover, EPA promoted proliferation by up-regulating Wnt/β-catenin pathway (DVL2, β-catenin, c-myc, Cyclin-D1, PCNA), also induced apoptosis by enhancing p53 and Caspase-3 expression. EPA significantly suppressed DSS-induced UC by inhibiting inflammatory pathways such as IL-6/Stat3, TNF-α/NF-κB, TLR4/NF-κB, and NLRP3/IL-1β as well as facilitating the renewal of colon epithelium by up-regulating proliferation and apoptosis. **Conclusions:** Our data supported EPA as a promising agent for combating UC.

Effects of Kiwifruit Intervention on Inflammation Markers and Body Composition of Overweight or Obese Students in University

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Keywords: Obese · Metabolic syndrome · Kiwifruit · Fat mass ratio · Blood pressure · HbA1c
Background/Aims: Because of the changed dietary patterns, the Body Mass Index (BMI) of college students has increased during recent decades. It is well-known that higher BMI is related to metabolic syndrome and diabetes mellitus. **Methods:** In this study, twenty two students (with body weight over than 10% of ideal body weight or 25< BMI <40) in university were recruited to participate the 6-week evaluation. Each student ate two kiwifruits per day for 6 weeks. Before (0 week) and after (6 week) the evaluation, blood samples of students were collected for biochemical assessment and anthropometric measurements and blood pressure were perform at 0, 3, 6 week. The result data were statistical analysed by pair t-test. **Result:** Results showed that there was no significant change in body weight and BMI after 6 weeks of experimentation, but the fat mass ratio was significantly reduced. Further, blood pressure was grouped. Group A was SBP ≧125 mm Hg, and group B was SBP <125 mm Hg. Blood pressure and HbA1c were significantly decreased in group A. IL-6 and malondialdehyde (MDA) were observed to decrease in group B, while Ferric-reducing antioxidant power (FRAP) was significantly increased. **Conclusions:** The results show that the intake of kiwifruit can reduce the body fat mass ratio of obese or overweight groups, improve blood pressure and blood sugar levels, and have the effect of regulating the inflammatory response in the body. ISU-105-IUC-12.

Antiobesity Effect of Capsaicinoid Exctracted From Green Chili via Modulating Lipid Absorption Related Genes in Obese Mice

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Keywords: *Capsicum annuum* · Green chili · Capsaicinoids · Anti-obesity activity · Lipid absorption · Obese mice
Background/Aims: Obesity has been a serious health problem these days, shown by its numerous cases worldwide. Currently, there are more than 400 million adults struggling with obesity and other obesity related metabolic syndromes such as: cardiovascular disease (CVD) and type-2 diabetes mellitus (T2DM). Green chili (*Capsicum annuum*) has been a significant part of Indonesian food culture and its major phytochemical component, capsaicin has been proven to exert anti-obesity efficacy. However, the molecular mechanism by which it exerted anti-obesity effect is still unclear. Thus, this research investigated whether capsaicinoid fraction (CF) from green chili modulated the expression of four lipid absorption related genes (LIPF, PLA2G2A, FATP4, and MGAT2) in obese mice by quantitative Real Time-PCR (qRT-PCR). **Methods:** CF was extracted using a Soxhlet apparatus and quantified for its capsaicin content by HPLC. Mice were fed with a high fat diet (HFD) for 5 weeks to induce obese condition, followed by treatment with CF (10 and 25 mg/kg BW) and an orlistat standard. **Results:** HPLC profile showed that capsaicin content in CF was 70639 μg/g. The decrease of total cholesterol and triglyceride levels was occurred after four weeks of CF treatments at both dosages. At 25 mg/kg BW, CF showed the significant upregulation of gene expression of LIPF, PLA2G2A, FATP4, and MGAT2 in the liver organ of obese mice compared to that of positive control. **Conclusion:** CF proved its anti-obesity efficacy at molecular level by modulating lipid absorption related genes in obese mice.

Antidiabetic Activity of Capsaicinoid Extracted From White *Capsicum frutescens* through Modulation of AMPK Related Genes in Diabetic Mice

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Keywords: Adenosine 5'-monophosphate-activated protein kinase · Antidiabetic activity · Capsaicinoid fraction · *Capsicum frutescens* · Diabetic mice
Background/Aims: Capsaicinoid fraction (CF), the pungent compounds present in chili pepper (*Capsicum frutescens*), has been reported for its multi pharmacological effects. The present study was aimed to investigate antidiabetic activity of CF extracted from C. frutescens Mahkota strain in diabetic mice through modulation of adenosine 5'-monophosphate-activated protein kinase (AMPK) related genes, including PEPCK, G6Pase, PGC1α, and SIRT1. **Methods:** CF was extracted from dried powder chili by a Soxhlet apparatus using absolute ethanol as solvent (1:10). Identification and quantification of capsaicin was performed using High Performance Liquid Chromatography (HPLC) system equipped with a reverse-phase C18 column. For diabetic mice model, alloxan at low doses (80 and 120 mg/kg BW) was given for 14 days to induce diabetes in mice, followed by orally administration of CF at 10 and 25 mg/kg BW in diabetic mice for 28 days. **Results:** HPLC chromatogram showed that capsaicin was detected at 13.116 minutes, with concentration of 60186.1067 μg/g. CF at low dose (10 mg/kg BW) was found to effectively reduce the fasting plasma glucose levels in diabetic mice. Positive regulation results were obtained from SIRT1 and PGC1 gene expression in the liver of diabetic mice, while negative regulation profiles were obtained from

PEPCK and G6Pase gene expression in both liver and skeletal muscle of diabetic mice. These changes lead to the activation of AMPK, which maintains glucose homeostasis by decreasing hepatic gluconeogenesis and increasing glucose uptake. **Conclusions:** CF may offer a promising functional food ingredient for management of type 2 diabetes mellitus.

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Andaliman Essential Oil Modulates Adipogenic Differentiation in Obese Mice

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Keywords: *Zanthoxylum acanthopodium* · Essential oil · Anti-obesity effect · Adipogenic differentiation · Adipogenesis · Obese mice

Background/Aims: Obesity is caused by adipogenesis that involves changes of transcriptional activation of adipogenesis-related genes, such as PPARγ, C/EBPα, and SREBP1. *Zanthoxylum acanthopodium* fruit or lemon pepper, known as andaliman, is one of Indonesian endemic spice with high essential oil content, a spicy-bitter taste, and lemon aroma. This research was conducted to explore whether essential oil fraction from *Z. acanthopodium* fruits modulated the expression of adipogenesis-related genes, such as PPARγ, C/EBPα, and SREBP in obese mice by employing quantitative Real Time-PCR (qRT-PCR). **Methods:** Essential oil was extracted using maceration in ethanol and ethyl acetate solvents, followed by identifying its chemical compounds by Gas Chromatography-Mass Spectrometry (GC-MS) analysis. For in vivo obese model, mice were fed with high fat diet for 5 weeks to induce obese condition. Essential oil (10 and 25 mg/kg BW) and orlistat standard (5 mg/kg BW) were orally given to obese mice for 4 weeks. Adipogenesis-related genes expression was measured from adipose tissue and liver. **Results:** GC-MS profile revealed that *Z. acanthopodium* consisted of 77.4% of essential oil. High fat diet in mice group caused an increase of total cholesterol levels compared to that of standard diet group, while treatment of essential oil at low dose (10 mg/kg BW) reduced total cholesterol level in obese mice. The qRT-PCR data showed that essential oil significantly downregulated the expression of adipogenesis-related genes including PPARγ, C/EBPα, and SREBP1 genes in obese mice. **Conclusions:** Thus, *Z. acanthopodium* essential oil may offer a novel ingredient in functional food product development for management of obesity.

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Nutrient Composition and Glycaemic Response of Rice and Tuhau (*Etlingera coccinea*) Meals

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Keywords: Tuhau · *Etlingera coccinea* · Glycaemic response · Nutrient composition

Background/Aims: Tuhau (*Etilingera coccinea*) is a type of wild ginger torch from Sabah, East Malaysia. The indigenous Kadazandusun ethnic group has traditionally pickled tuhau. More recently it has been made into fried floss. Both preparations are usually eaten with rice and fish/chicken. The objectives of this study were to determine the nutrient composition and glycaemic response of two meals: 1) rice + chicken + pickled tuhau, and 2) rice + chicken + fried tuhau floss. **Methods:** The preparation methods were documented using focused interviews with key resource persons (n = 5). Test meals were prepared using standardised recipes derived from them. Nutrient composition of both tuhau samples were determined using standard AOAC methods. Glycaemic response was measured in 11 healthy individuals in a random, cross-over design, using standard recommended methods. **Results:** The nutrient composition of the pickled tuhau meal was 50 g carbohydrate, 7.6 g protein, 1.7 g fat, 0.8 g dietary fibre; and the fried tuhau floss contained 50 g carbohydrate, 14 g protein, 14 g fat, 4.05 g dietary fibre. The glycaemic response and glycaemic index of pickled tuhau served with rice and chicken (IAUC = 156.56; GI = 59.705.95, medium GI) was lower than the glycaemic response and the glycaemic index of fried tuhau floss served with rice and chicken (IAUC = 193.15; GI = 71.53 5.79, high GI). **Conclusion:** the traditional method of consumption resulted in better post prandial blood glucose response.

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Effect of Genetically Decreased BCAA Concentration on Glucose Tolerance in Mice

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Keywords: BCAA · Glucose tolerance · Muscle · Adipose tissue

Background/Aims: Branched-chain amino acids (BCAAs) are essential amino acids for building proteins, and also exist as free amino acids to play an important role for regulating protein and glucose metabolism. The concentrations of free BCAAs are tightly regulated by the BCAA catabolic pathway in which the first two steps are common for three BCAAs. The second step is the rate-limiting step in which branched-chain alpha-keto acids (BCKAs) are oxidatively decarboxylated by BCKA dehydrogenase (BCKDH) to form branched-chain acyl-CoAs. The BCKDH activity is regulated by BCKDH kinase (BDK) which causes inactivation. **Methods:** Recently, we generated the BDK knock-out (KO) mice

and showed the BCKDHs in several tissues were fully activated and the plasma BCAA concentrations were decreased to less than 50% of the control mice. We confirmed the BDK-KO mice showed neurological defects as the previous report, and also found deteriorated glucose tolerance by feeding either control or high-fat diet (HFD). We also produced the muscle- or adipose tissue-specific BDK knock-out (BDK-mKO or adKO) mice to find out which tissue is responsible for the phenotype. **Results:** The both BDK-mKO and adKO mice fed control diet showed no abnormalities in glucose tolerance, indicating that other tissue's BCAAs are involved in maintaining normal glucose metabolism. However the HFD-fed BDK-adKO, but not mKO mice, got worse glucose tolerance than control mice, which was ameliorated by giving the drinking water with 3% BCAA. **Conclusions:** These results suggest that adipose tissue is responsible for deterioration of HFD-induced glucose intolerance by decreased BCAA concentrations.

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Intestinal Barrier Dysfunction and Gut Microbiota Alteration Contributes to Learning and Memory Impairment Induced by 27-Hydroxycholesterol in APP/PS1 Mice

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Keywords: 27-hydroxycholesterol · Intestinal barrier function · Gut microbiota · Alzheimer's disease

Background/Aims: Oxysterols have been shown to promote and sustain Alzheimer's disease (AD) in both cohort studies and animal models. The emerging role of 27-hydroxycholesterol (27-OHC) has stimulated research on the influence of pro-inflammatory properties in inducing disturbance of brain and intestinal epithelial barriers. Despite research efforts, there are no defined explanations of how 27-OHC can lead to these intestinal and neurobehavioral conditions. This work investigated the role of 27-OHC combined with plasma oxysterols representative of AD to induce the loss of intestinal mucous integrity and the imbalance of gut microbiota in APP/PS1 Tg mice. **Methods:** We performed the male APP/PS1 Tg animals of C57BL/6 background treated daily with subcutaneous injections with 27-OHC (5.5 mg/kg/d) or with 27-OHC synthetase inhibitor (anastrozole) (0.2 mg/) for 21 days, and observed the intestinal barrier function was destroyed after 27-OHC treatment in APP/PS1 Tg mice. **Results:** 27-OHC was found to be associated with down-regulation of the tight junction zonula occludens-1 (ZO-1), occludin (Ocln) and claudin-5 (Cldn-5), and up-regulation of claudin-1(Cldn-1) in the ileum and colon. Persistent imbalances in these responses resulted in damage to the intestinal mucous barrier, leading to alterations of gut microbiota and intestinal mucous barrier dysfunction. **Conclusions:** The present study highlights the possibility that 27-OHC produces a synergistic effect on intestinal barrier dysbiosis and gut-brain axis abnormalities.

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On Arsenic Distribution in Organs of Rats Fed Brown Algae, Akamoku (*Sargassum horneli*)

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Keywords: Akamoku · Arsenic · Rat · Activation analysis

Background/Aims: A brown alga, Akamoku (*Sargassum horneli*), containing high amount of dietary fiber, is coming to be consumed year by year much more, in Japan. Akamoku is a member of the same family of Hijiki, Sargassum fusiforme, contains rich amount of nutritionally beneficial minerals as well as arsenic. The behavior of arsenic derived from Akamoku is not yet clear in the body. In this report, we investigated the arsenic distribution in various organs of rats fed Akamoku. **Methods:** Akamoku plants, harvested at a sea coast of Kyusyu, Japan, were washed, lyophilized and pulverized. Sprague Dawley male rats were fed either (i) the diet containing pulverized Akamoku plants or (ii) the standard diet (AIN-93G) for two weeks. The samples of the respective organs were lyophilized, sealed in polyethylene bags, and the arsenic contents were determined by thermal neutron activation analysis. **Results:** Arsenic accumulated mostly in blood cells, and also in spleen. This is coincided with the mechanism that rat can detoxicate the arsenic toxicity by binding arsenic at cysteine93 of hemoglobin. In other organs, more or less arsenic was accumulated. It is necessitated for us to find urgently a simpler and most effective way to reduce the arsenic content in Akamoku plants by the precooking process.

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Piceatannol Inhibits the Obesity Induced by Estrogen Deficiency in Ovariectomy Mice

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Keywords: Piceatannol · Obesity · Estrogen deficiency · Ovariectomy

Background/Aims: It is well known that the estrogen deficiency in postmenopausal women leads to the obesity, especially visceral fat accumulation, increasing the risk of developing diabetes, hypertension and dyslipidemia. Piceatannol (3, 3', 4, 5' tetrahydroxy-trans-stilbene), one of the analogs of resveratrol, is a naturally occurring phytochemical and found to be contained in large amount in passion fruit (*Passiflora edulis*) seeds. Resveratrol is

known to exert a variety of beneficial effects, including anti-cancer, anti-obesity, anti-inflammatory and estrogenic activity. Several studies show that piceatannol is more effective than resveratrol, therefore, we investigated the effect of piceatannol on the obesity in ovariectomy (OVX) mice. **Methods:** Female C57BL/6J mice were operated at 10 weeks of age and sham-operated mice were fed the high fat diet (45% fat with reference to AIN-93). OVX mice were divided into 3 groups and fed the high fat diet containing 0, 0.05 and 0.25% piceatannol, respectively for 12 weeks by pair-feeding. The body weights were measured once a week. The volume of visceral and subcutaneous fat was analyzed by micro CT scan at every 4 weeks. **Results:** Although the body weight of OVX mice was significantly heavier than sham, there was no significant differences among 3 groups of OVX mice. Results of 3D imaging analysis by micro CT scan showed that the visceral fat of mice fed 0.25% piceatannol was significantly reduced compared to those of the other OVX groups. **Conclusions:** Piceatannol was effective to suppress visceral fat accumulation in OVX mice.

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Metabolic Conversion of Siphonaxanthin, a Carotenoid From Green Algae, Increases Its Anti-Inflammatory Activity

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Keywords: Carotenoid · Metabolism · Anti-inflammatory · IRFs · Nrf2

Background/Aims: Siphonaxanthin is a carotenoid of green algae such as *Caulerpa lentillifera*, which is a popular seafood in Okinawa, Japan. According to our screening results, siphonaxanthin showed the most potent anti-inflammatory activities among the carotenoids we used. We, in this study, aimed to elucidate metabolic conversion of siphonaxanthin and its effect on the anti-inflammatory activities. Furthermore, we tried to reveal molecular mechanisms underlying anti-inflammatory effects of siphonaxanthin and its metabolites. **Results:** Incubation with rodent liver homogenates produced 3 major metabolites of siphonaxanthin in nicotinamide adenine dinucleotide (NAD)+-dependent manner. Using nuclear magnetic resonance spectroscopy (NMR) and liquid chromatography-mass spectrometry (LC-MS) analyses, we revealed that these 3 metabolites were dehydroforms of siphonaxanthin and identical with the metabolites existing in siphonaxanthin-fed mice. Human hepatocyte model, HepG2 cells, also produced the same metabolites, indicating that not only rodent but also human has an ability to convert siphonaxanthin into the dehydrometabolites. Next, we evaluated inhibitory effects of the metabolites on the activation of nuclear factor kappa B (NF-κB) and interferon response factors (IRFs) using reporter genes-transfected cells. The metabolites more potently suppressed triacyl lipopeptide-induced IRFs activation than intact siphonaxanthin, and their inhibitory

effects were canceled in the presence of inhibitors of nuclear factor erythroid 2-related factor 2 (Nrf2). **Conclusions:** the metabolic conversion of siphonaxanthin increases its anti-inflammatory activity caused by Nrf2 activation.

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Effect of Amino Acid Composition of Dietary Protein on Redox State of Plasma Albumin in Rats Fed Low-Protein Diets

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Keywords: Albumin · Redox · Cystine · Low-protein diet

Background/Aims: The aim of the present study was to examine whether the amino acid composition of dietary protein modulates the redox state of plasma albumin in rats. **Methods:** Male Sprague–Dawley rats fed one of the experimental diets for 2 weeks. In experiment 1, rats were fed low-protein diets containing 5% casein (CA), 5% egg white (EW), or 6% wheat gluten (WG). In experiment 2, rats were fed a 5% CA diet supplemented with either glycine or cystine. In experiment 3, rats were fed a 5% soy protein isolate (SPI) diet or the diet supplemented with either methionine or cystine. The percentage of reduced form of plasma albumin (mercaptalbumin, MA) was analyzed using high-performance liquid chromatography. **Results:** The percentage of MA within the total plasma albumin was significantly lower in rats fed the 5% CA diet than in those fed the EW and WG diets. Compared with EW or WG, CA contains lower amounts of glycine and cysteine. The percentage of MA within the total plasma albumin was significantly higher in rats fed the 5% CA diet supplemented with cystine than that in rats fed the 5% CA diet supplemented with glycine. The percentage of MA within the total plasma albumin was significantly higher in rats fed the 5% SPI diet supplemented with cystine than in those fed the 5% SPI diet or the 5% SPI diet supplemented with methionine. **Conclusions:** Dietary protein with a high cystine content would be effective to maintain plasma MA levels in rats fed low-protein diets.

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A Study on Illegal Hazardous Compounds in Dietary-Supplements

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Keywords: Sibutramine · Orlistat · Desmethylsibutramine · Didesmethylsibutramine · Chlorosibutramine

Background/Aims: This study was aimed to investigate the illegal hazardous compounds in dietary-supplements. **Methods:** We analyzed the contents of anti-obesity drugs, their analogues(orlistat, sibutramine, desmethylsibutramine, dides-

methylsibutramine, chlorosibutramine, chloro-sipentramine) and three heavy metals(lead(Pb), cadmium(Cd), arsenic(As)) in 62 products, which is other processed products(n = 32), candies(n = 7), weight control foods(n = 10) and teas(n = 13). **Results:** Any anti-obesity drugs and their analogues were not detected in 62 samples. The contents of three heavy metals(Pb, Cd, As) were detected at the range of ND~0.177 mg/kg, 0.002~0.233 mg/kg and 0.001~0.188 mg/kg in teas, ND~0.370 mg/kg, 0.003~0.057 mg/kg and 0.007~0.120 mg/kg in candies, ND~0.055 mg/kg, 0.012~0.045 mg/kg and 0.010~0.163 mg/kg in weight control foods, respectively. The values of heavy metals(Pb, Cd, As) were detected at the range of ND~2.324 mg/kg, 0.004~0.936 mg/kg and 0.003~21.247 mg/kg in other processed products that are not regulated by specification standards according to food types. **Conclusion:** These results show that regulations of heavy metals is required in other processed products for food safety.

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Corosolic Acid Induces Non-Apoptotic Cell Death Through Generation of Lipid Reactive Oxygen Species Production in Cancer Cells

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Keywords: Corosolic acid · Lipid ROS · Non-apoptotic cell death · α-tocopherol

Background/Aims: Corosolic acid is one of the pentacyclic triterpenoids isolated from Lagerstroemia speciose and has been reported to exhibit anti-cancer and anti-proliferative activities in various cancer cells. In the present study, we investigated the molecular mechanisms of corosolic acid in cancer cell death. **Results:** Corosolic acid induces a decrease of cell viability and an increase of cell cytotoxicity in human renal carcinoma Caki cells. Corosolic acid-induced cell death is not inhibited by apoptosis inhibitor (z-VAD-fmk, a pan-caspase inhibitor), necroptosis inhibitor (necrostatin-1), or ferroptosis inhibitors (ferrostatin-1 and deferoxamine (DFO)). Furthermore, corosolic acid significantly induces reactive oxygen species (ROS) levels, but antioxidants (N-acetyl-l-cysteine (NAC) and trolox) do not inhibit corosolic acid-induced cell death. Interestingly, corosolic acid induces lipid oxidation, and α-tocopherol markedly prevents corosolic acid-induced lipid peroxidation and cell death. Anti-chemotherapeutic effects of α-tocopherol are dependent on inhibition of lipid oxidation rather than inhibition of ROS production. In addition, corosolic acid induces non-apoptotic cell death in other renal cancer (ACHN and A498), breast cancer (MDA-MB231), and hepatocellular carcinoma (SK-Hep1 and Huh7) cells, and α-tocopherol markedly inhibits corosolic acid-induced cell death. **Conclusion:** Therefore, our results suggest that corosolic acid induces non-apoptotic cell death in cancer cells through the increase of lipid peroxidation.

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Suppression of Blood Glucose Elevation by Buckwheat (*Fagopyrum esculentum Moench*) Albumin

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Keywords: α-Amylase inhibitor, Buckwheat, Albumin, Diabetes

Background/Aims: Hyperglycemia has a major impact on health and often leads to diabetes mellitus, with the number of patients estimated to be over 400 million worldwide. An effective means to prevent diabetes is to suppress the increase in postprandial blood glucose level by taking functional components. α-Amylase inhibitor (α-AI) is well recognized to suppress blood glucose elevation by inhibiting starch hydrolysis to glucose. Cereal seeds, such as wheat, rice, and barley contain a high concentration of α-AI albumin proteins to resist against animals. Buckwheat also contains a proteinaceous α-AI albumin that inhibits porcine pancreatic α-amylase. However, the effect of buckwheat α-AI in vivo have not yet been investigated. In this study, we examined the suppressive effect of buckwheat α-AI on postprandial hyperglycemia and characterized its digestibility to understand the behavior of buckwheat α-AI in vivo. **Methods:** Buckwheat α-AI albumin was administered to rats together with starch or glucose and the blood was collected to determine blood glucose and insulin levels. The digestibility of buckwheat α-AI albumin was evaluated by both SDS-PAGE and the residual α-amylase inhibitory activity after treatment with digestive enzymes, pepsin and trypsin. **Results:** The blood glucose and insulin levels were suppressed by buckwheat α-AI albumin not after glucose loading but after starch loading. In addition, buckwheat α-AI albumin was hydrolyzed to peptides but still exhibited α-amylase inhibitory activity. **Conclusion:** These results indicate the bioactive peptides were produced after digestion of buckwheat α-AI albumin to suppress hyperglycemia, which was different mechanism from other cereal α-AIs.

Track 7: Public Health Nutrition

Oral presentation

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Nutrition Programs to Improve Nutritional Status of Industrial Women Workers in Indonesia

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Keywords: Workplace nutrition · Indonesia · Women · Worker

Background/Aims: Over the last two decades, it is estimated that women work forces in industrial sector increases 4.3% annually. In particular, 78% workers in garment and textile industries are females. The Indonesian Government has a target to increase its total export values from textiles and garments to reach USD 75 billion by 2030 – bringing its total contribution towards global export values of 5%. This target will increase the number of women working long hours at the industrial sites leading to an increased risk of having nutritional problems if no prevention policies or interventions were in place. This analysis was aimed to assess nutritional status of women workers and to identify opportunities of policy options for improving the situation of women workers. **Methods:** A total of 44 in-depth interviews and quantitative field assessment were conducted at 18 textile and garment factories across three provinces of East Java, Central Java and West Java. **Results:** The nutritional status of women workers in Indonesia were varied, both undernourished and overweight were presents. Systematic measures to identify nutritional problems and nutrition interventions for women workers in Indonesia were very limited. The existing nutrition programs were local and sporadic in nature – even though the national guideline was available. **Conclusions:** The current policies and programs at national, provincial and company levels were not comprehensively addressed double burdens of malnutrition among woman workers.

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The Effect of Vitamin A Supplementation Given Shortly- and 6 Weeks-After Giving Birth on Breast Milk Retinol Levels and Infant Morbidity

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Keywords: Vitamin A Supplementation · Breast milk retinol · ARI · Diarrhea

Background/Aims: The aim of this study was to explore the effect of maternal vitamin A supplementation shortly after delivery vs. supplementation at six weeks after delivery on breast milk retinol levels and on infant morbidity. **Methods:** This study used a quasi-experimental design, with two intervention groups, namely group A (given vitamin A supplementation just after delivery) and group B (given vitamin A supplementation at six weeks after delivery). The number of subjects in this study was 65 people selected based on inclusion criteria. The collection of breast milk samples for retinol analysis was carried out in three stages, namely 0 months (colostrum), 1 month and 3 months after delivery. Data on morbidity, includes ARI and diarrhea was collected every 2 weeks from birth until three months olds. **Results:** There was no difference in retinol levels in the colostrum (p = 0.305), in breastmilk at 1 month (p = 0.707) and in breastmilk 3 months (p = 0.826) between groups. However, there was a significant decrease in breast milk retinol levels after 3 months in group A (p = 0.010), while such decrease was not significant in group B (p = 0.187). In terms of morbidity, there was no difference on the frequency and the duration of infant illnesses between groups (p > 0.05). **Conclusions:** Vitamin A supplementation at six weeks after delivery was able to maintain breast milk retinol levels within normal limits at three months, but did not have a significant effect on infant morbidity.

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Quality of Life of Retirable Personnel in State Universities in the Philippines: Implications for Nutrition Education

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Keywords: Retirable personnel · Quality of life · QOL domain · QOL indicator

Background/Aims: Issues associated with the ageing workforce include health status, financial adequacy, increasing cost of health care and lifestyle, prevailing social attitude, recreational pursuits and retirement regulations e.g. 65 years as mandatory retirement age. Further direction and support are needed from the government, policymakers and health professionals in developing appropriate programs and services to meet emerging needs of this population. This research described the socio-demographic profile, retirement plans and perceived quality of life of reti-

rable personnel in selected state universities in the Philippines. It determined if significant relationship exist between the socio-demographic profile of the respondents and their quality of life. **Methods:** Using mixed method, 242 retirable personnel 55-64 years old were studied in three state universities. The WHO quality of life questionnaire (WHOQOL-100) covering domains of physical health, psychological state, level of independence, social relationships, environment, personal beliefs and overall quality of life and general health was used. Interviews and focused group discussions were conducted. **Results:** Majority of respondents was female, married, masters' and doctorate degree holders, belonging to the middle-salary bracket and occupying permanent appointments. Their retirement plans were primarily concerned with their personal beliefs, social relationships and physical health. There were significant relationships between the perceived QOL and socio-demographic profile. Prevalent health problems were revealed as high blood pressure, arthritis and diabetes. Analyzing specific facets, the implications to Nutrition Education are discussed. **Conclusion:** Although respondents were generally satisfied with their life, quality of life and health, nutrition professionals can positively impact the life of retirable personnel.

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Eating Culture of Sundanese Traditional Salad (*Lalapan*) in Rural and Urban: A Comparative Study from Bogor District, West Java

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Keywords: Eating culture · *Lalapan* culture · Sundanese salad · Traditional salad

Background/Aims: Eating *lalapan* (a traditional salad) is one of wisdom cultures of Sundanese, one of ethnics in Indonesia. Eating *lalapan* could increase intake of micro nutrients and other healthy substances. Urbanization, agriculture evolution, and differences in rural and urban development could change the eating culture of *lalapan* by Sundanese. The aim of this study was to analyze the differences in eating culture of *lalapan* between rural and urban areas of West Java, where most Sundanese reside. **Methods:** Sixty healthy Sundanese women aged 30–49 years old were recruited from two locations in Bogor District. The culture of eating *lalapan* was collected through interview. Consumption of lalapan was assessed using a semi-quantitative food frequency questionnaire (SQ-FFQ). **Results:** In both rural and urban areas, the most consumed fresh *lalapan* were cucumbers and cooked *lalapan* were cassava leaves. All participants consumed fresh *lalapan*, but only 76.6% in rural area and 86.7% in urban area consuming cooked *lalapan*. All participants consumed *lalapan* with chili sauce. About 80.0% of participants in rural area and 73.33% in urban area consumed *lalapan* with fried chili sauce. The eating culture of the subjects was predetermined by family eating culture. About 86.7% and 66.67% of subjects in rural and urban areas respectively, their eating culture was influenced by their family. **Conclusion:** The study

indicated that the eating culture of *lalapan* was still being done by Sundanese both in rural and urban areas. It is suggested to study the health benefits of *lalapan* eating culture for human body.

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Mothers' Knowledge on Stunting: Cross Sectional Study in Indonesia

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Keywords: Stunting · Mother's knowledge · Mother's education · Children

Background/Aims: Despite a decline, the prevalence of stunting in Indonesia is still very high as shown in Health Researches Survey (*Riskesdas* 2013 and 2018). Around one-third of Indonesian under-five children were stunted. In some provinces, half of under-five children were stunting. Mothers knowledge on stunting would affect mother's preventive and curative actions toward stunting. This study aims to assess mothers' knowledge on stunting. **Methods:** This study interviewed 2,100 mothers of 6–23 month children in 10 provinces (South Sumatra, West and East Java, West and Central Kalimantan, West and East Nusa Tenggara, Gorontalo, Maluku, and North Sulawesi) in Indonesia. **Results:** The results indicated a very poor knowledge on stunting among respondents. Measured by composite knowledge score, in the scale of 0 (not knowledgeable at all) to 5 (highly knowledgeable), the mean score was 1.00. Around 65.2% mothers had score 0 and only 1.5% had perfect score of 5. Multivariate analysis shows that levels of education, financial status, accessing health services and watching television were all related to higher knowledge levels. The most dominant factor was level of education (none or less than primary school graduate). **Conclusion:** Knowledge on stunting has complex dimension and relevant multiple stakeholders should be pushed to take part in preventing and overcoming stunting through increasing.

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Analysis of Drinking Water Consumption among Young Women from Tourism Vocational High School in Bandung

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Keywords: Young women · Water · Beverage type

Background/Aims: Water requirements for each individual will vary depending on body size, age, sex, type of work, and the environment. Young girls have 1.6 times the risk of dehydration as compared to boys. The purpose of this study was to determine the type of beverage and frequency and adequacy of drinking water among adolescent girls in Tourism Vocational High School in Bandung. **Methods:** The research method used was a descriptive

cross-sectional design. The population of the study was 645 students of Tourism Vocational High School in Bandung who have studied the science of nutrition. Samples were 88 girls selected randomly with a confidence level of 90% (α = 0.1). The data collection technique was using 24-hr recall and Food Frequency Questionnaire. **Results:** The results showed that the type of beverage consumed is milk, refill bottled drinking water, fresh fruit juices, soft drinks and isotonic drinks. Frequency of consumption of liquid milk was 2.7 times/week, refill bottled drinking water 22.8 times/week, fresh fruit juice 1.0 times/week, carbonated drinks 0.2 times/week, and isotonic 0.4 times/week. On average, the daily water intake was 125% of the recommended requirements. **Conclusion:** Consumption of water among girls exceeds the recommended requirements; while liquid milk and drinking water were the most commonly beverage consumed.

Eating Disorders Risks and Over Intake of Energy and Macronutrients among Girl Students in Mitra Keluarga School of Health Sciences

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Keywords: Eating disorders · Macronutrient intake · Obesity
Background/Aims: Groups of adolescents who have eating behavior disorders, food intake restrictions, alcohol consumption, and drug addiction require special nutritional attention. In 2013 there were 7.3% of obese teens in Indonesia. This prevalence increases every year. This study aims to determine the risk of eating disorders and their relationship with excessive food intake. **Methods:** This study was cross sectional design with the sample size of 97 girls in grade of university level. Risk of eating disorders was determined by using questionnaires Eating Attitudes Test (EAT-26). Intake of nutrient was collected by semi quantitative questionnaire. Data was analyzed by Chi-square test using SPSS. **Results:** The results found that among girls, 5% were at high risk of eating disorder, more than 50% have over intake of energy, protein and fat, and 46.4% have over intake of carbohydrate. There was no relationship between risk of eating disorder and energy and macro nutrient intake. However, those who were at high risk of eating disorder have over intake of energy, carbohydrate, protein and fat. **Conclusion:** Adolescent girls who were at high risk of eating disorders have higher intake of energy and micronutrients. It is recommended for further research on eating disorders risks, eating behavior and body image.

Acceptability of Fruits Based on Color, Type, Shape, Packaging and Price Combinations by Elementary School Students in East Jakarta

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Keywords: Fruit · Acceptance · Combination · Children
Background/Aims: The National Basic Health Research (*Riskesdas*, 2013) showed that 95% people over the age of 10 years old consumed less fruits and vegetables. Based on Individual Food Consumption Survey (SKMI, 2014), almost all Indonesians consumed vegetables (94.8%) but only a few consumed fruit (33.2%). This research aims to determine the differences in fruit acceptability based on color, types, shape of pieces, packaging combinations, and price of fruit. **Methods:** The total number of 36 students were selected by purposive sampling methods and organoleptic tests were carried out to determine acceptance. The Friedman statistical test was carried out to analyze the data. **Results:** The results showed that among 4 fruit color combinations, students liked the combination of red, green, orange and red, green, white (69.4%), a combination of watermelon, melon, and apple (72.2%), cut shapes star (83.3%), round plastic bowl packaging and cylindrical plastic bowl (83.3%), and the price of IDR 1,702 (69.4%) (1 USD = 14,000 IDR). There was a significantly difference in fruit acceptance based on color combinations (p = 0.000), combination of types (p = 0.004), shape of pieces (p = 0.000), packaging (p = 0.000), and price (p = 0.020). **Conclusion:** Adolescent students preferred combination of red-green-orange or red-green-white colors, star-shape cuts, round or cylindrical packaging and price of about 12 cents USD.

Nutritional and Health Status of Under-Five Children Post 2018 Earthquake in East Lombok

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Keywords: Nutritional status · Under-five children · Post disaster · Earthquake
Background/Aims: Any form of disaster brings survivors to a risk of mortality due to acute malnutrition. Disruptions of access toward clean water, food, and health services have negative consequence to nutritional status of vulnerable population, particularly young children. **Methods:** A cross sectional survey was conducted in 2 sub-districts devastated by the earthquake. For this study, 20 children age 6–49 months from each of the 24 clusters (total of 480 under five children) were assessed in December 2018, four months after the first earthquake hit Lombok. Anthropometry assessment of BMI-for-age (wasting), height-for-age (stunting), and weight-for-age (underweight) was used to measure the nutritional status.

Hemoglobin level was measured by HemoCue. Primary caregiver (mother or other family member) was interviewed to obtain information on demographic characteristics, hygiene and sanitation, child morbidity, and feeding practices. **Results:** Wasting, stunting, and underweight prevalence were 10.2%, 33.3%, and 28.8%, respectively. Prevalence of children with moderate to severe anemia was 43.8%. The prevalence of each indicator was higher in boys than in girls. Two weeks prior to the survey, 85.4% children had diarrhea. Open defecation was practiced by 12.1% of family that had their toilet impaired (14.8%). Food diversity in 67.9% children was lacking. **Conclusion:** Post 2018 earthquake, children under-five in East Lombok had high prevalence of both acute and chronic under nutrition as well as micro-nutrient deficiencies. Nutrition intervention is urgently required in order to prevent further deterioration of nutritional status as well as its negative consequence on development in under-five children.

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The Relationship between Trans-Fat Intake and Free Radicals among People with Central Obesity

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Keywords: Trans-fat · Malondialdehyde · Free radicals · Vitamin A · Central obesity
Background/Aims: The existence of free radical triggers various diseases. Overconsumption of trans-fats causes degenerative illnesses which increase the degree of free radical. Central obesity happens because of changes in lifestyle. The objective of the study was to explain the relationship between trans-fats intake and the degree of free radical intake on people with central obesity. **Methods:** The research employed observational analysis with a cross-sectional approach. The populations of the study were employees of Transmigration and Workforce Office of Central Java Province in Semarang. The 43 subjects were chosen purposively. Data on nutrient status were obtained by calculating BMI and measuring waist circumference. Data on food intake were collected by using 3x24-hour recall. Data analysis was done using rank Spearman test and multivariate analysis using binary logistic regression. **Results:** Mean and standard of deviation on plasma malonaldehyde (MDA) was 1.80 ± 0.47 μmol/L. The subjects' average trans-fats intake was 8.0%). There was relationship between trans-fats intake ($p = 0.04$) and Vitamin A intake ($p = 0.047$) with the blood MDA concentration. There was a relationship between trans-fats intake ($p = 0.038$) and blood MDA concentration after controlling with vitamin A intake. **Conclusion:** High trans-fats and vitamin A intake increases the blood MDA concentration among people with central obesity.

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Obesity Prevention Model with *Monogizi* Media in Elementary School Children

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Keywords: Media · Student · Obesity · Physical activity
Background/Aims: In childhood, playing is an important means of education for brain stimulation. Therefore, the concept of education that is most suitable at this time is the concept of education combined with play. One means of education that fits with the fun concept is through educational media included in children's games. One of the games that children love is the game of "monopoly". The study aims to assess the children's nutrition knowledge and attitude after intervention using game '*Monogizi*'. **Methods:** The research design was quasi-experimental design with a total sample of 44 respondents. The location of the study was at SDIT Menara Fitrah Indralaya, Ogan Ilir district, South Sumatera. The research used modify the game "monopoly" with the content and material presented regarding healthy nutritious food and healthy lifestyle which is named " *Monogizi* ". The game was carried out as much as 3 times with an interval of 1 week in between. In this study the pretest was done before the intervention and posttest after the intervention using a questionnaire. The children's knowledge and attitudes before and after intervention was tested by t-test analysis. **Results:** Prevalence of obesity was 11.4%. There was no relationship between physical activity, frequency of eating, frequency of breakfast, frequency of snacking, frequency of fast food consumption and frequency of consumption of snacks with the nutritional status of children ($p > 0.05$). There were differences in attitudes (p-value = 0.004) and knowledge (p-value <0.001) before and after intervention. **Conclusion:** Game '*Monogizi*' increased nutritional attitudes and knowledge among children.

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Status of Vitamin B12 among Healthy Adult and Elderly Population in India: A Review

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Keywords: Vitamin B12 · Indian · Prevalence · Healthy
Background/Aims: Vitamin B12 is a water soluble micronutrient found in animal foods. Its deficiency is not uncommon in India owing to vegetarianism but often unrecognized due to diverse clinical manifestations. This review aims to collate the current data on vitamin B12 status in healthy Indian adult and elderly population. **Methods:** Online database Pubmed was searched for articles published in English between 2000 and 2018. Inclusion criteria consisted of original studies conducted on apparently healthy adult and elderly Indian populations reporting serum/plasma vitamin B12 levels. Comprehensive literature search identified 15 studies eligible for inclusion. **Results:** The deficiency prevalence reached 78.5% and 61.7% among adults and elderly, respectively, based on varying cut offs. Higher vitamin B12 levels were reported in wom-

en than men. Hyperhomocysteinemia (Hcy > 15 μmol/L) was lower in females as compared to males (60% vs 90% and 14.9% vs 57.4%, respectively in two studies). The results indicate that inadequate vitamin B12 status is a wide spread problem in the Indian population. However, variety of laboratory methods and cut-offs of vitamin B12 deficiency and the heterogeneity in results pose challenges to draw clear conclusions on the extent of vitamin B12 deficiency in India. **Conclusion:** This review, therefore, highlights the need for more evidence based research to define age and sex specific cut offs for defining vitamin B12 deficiency.

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Awareness on Weekly Iron-Folic Acid (WIFA) Supplementation among School Going Adolescent Girls and Parents in East Java and East Nusa Tenggara, Indonesia

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Keywords: Adolescent girls · Anemia · Iron · Folic acid
Background/Aims: Since 2016, Indonesia has been gradually implementing a Weekly Iron-Folic Acid (WIFA) Supplementation Program in two provinces for school going adolescent girls to reduce anemia. This study aimed to explore the awareness and understanding of school going adolescent girls and parents regarding anemia and WIFA supplementation program. The study was conducted in 10 districts each from East Java province and East Nusa Tenggara province. **Methods:** Twenty focused group discussions (FGDs) with school going adolescent girls (n = 174) and ten FGDs with parents (n = 66) and in-depth interviews (IDIs) with school going adolescent girls (n = 20) and their parents n = 10) from 40 schools were conducted. All FGDs and IDIs were audio-recorded, verbatim transcribed, and analyzed for themes using NVivo Pro 12. **Results:** Girls and parents showed high levels of misinformation about anemia and healthy nutritional practices, which were being influenced by socio-cultural milieu and local food habits. Both parents and school going adolescent girls perceived low risk of anemia for school-going adolescent girls. Girls felt that their parents' opinion about anemia influenced their desire to consume WIFA. **Conclusion:** School going adolescent girls and parents would benefit from increased access to information about anemia risk and prevention and the benefits of WIFAS in the adolescent age group. This should include relevant dietary guidance that considers their socio-cultural milieu and local dietary habits.

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Vitamin D [25(OH)D] Deficiency in a Cohort of Mothers and Their Offsprings in Sri Lanka. Is It Real?

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Keywords: Vitamin D · Deficiency · Sri Lanka · Cut-offs values · Supplementations
Background/Aims: High rates of biochemical 25(OH)D deficiencies among healthy individuals have been reported in large scale studies across the world. Two small studies in Sri Lanka have shown high rate of 25(OH)D deficiency among preschoolers and women in reproductive age. However, cut-off to define 25(OH)D deficiency varies between studies. We investigated 25(OH)D status of infants, pregnant and lactating mothers in Colombo district in Sri Lanka with best available cut-off levels recommended by Institute of Medicine USA (IOM) based on North-Americans. We selected pregnant mothers since they are not routinely supplemented with vitamin D. **Methods:** Mothers at 3rd trimester (n = 105) were recruited and followed up at 4–6 weeks after delivery with their babies. Blood sample were obtained and tested for serum 25(OH)D, parathyroid hormone (PTH) and alkaline phosphatase (ALP). Data were analyzed using SPSS version 15.0. **Results:** Mean serum 25(OH)D levels (unit: ng/mL) during pregnancy, lactation and infants were 18.6 ± 7.2, 20.6 ± 6.9 and 11.4 ± 5.6 respectively. The deficiency (<12.5 ng/mL) was distributed among pregnancy, lactation and infancy as 20%, 10.5% and 74.3% respectively. However, ALP and PTH did not correlate significantly with 25(OH)D. **Conclusion:** Although we have shown high rate of deficiency in our population, we were unable to correlate our findings to bone mass density. Thus, screening of our population through large epidemiological studies may lead to justified public health policies on vitamin D supplementation. Since used IOM classification derived from studies conducted in North-Americans, there is a critical public health and clinical practice need for consensus cut-off point for South Asians.

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Determinants of High School Girl Adolescents' Adherence to Consume Iron Folic Acid Supplementation in Depok

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Keywords: Adherence · Adolescent girls · School-based program · Weekly iron
Background/Aims: Anemia is major problems among adolescent girls in Indonesia. Weekly supplementation of iron and folic acid was an effective measure to tackle this problem. However, adherence to the supplementation is still low. Using cross sectional design, this study aimed to explore determinants for high school

girls' adherence to consume iron and folic acid tablets. **Methods:** Sample size was calculated based on a pilot study guideline resulting in 136 samples. After consent were obtained, data were collected, coded and analyzed using SPSS 23. Inclusion criteria for the subjects was female high school student from 13 schools which had took iron tablets as a program. **Results:** Majority, the subjects were aged 16–17 years old (51.5%). Majority of schools did not organize drinking iron tablets together (60.3%). The adherence to iron and folic acid tablets consumption was 34.6%. Most of respondents (60.7%) did not think that iron tablets were necessary, while 18% experienced side effects. Factors that correlated to student's adherence were school organizing to drink iron tablet together, student's knowledge, motivation, ever been checked for Hemoglobin, and received information on benefits of iron tablet from teachers and health staff. Multivariate analysis showed that the most important determinant factors for adherence were students' motivation (OR = 66.28, CI = 10.8–403.6, P = 0.00), school organized students to drink iron tablets together (OR = 29.8, CI = 5.5–161.1, P = 0.00) and ever checked Hemoglobin (OR = 0.24, CI = 0.06–0.92, P = 0.03). **Conclusion:** Students' motivation, organized drinking iron tablet at school and hemoglobin check were associated with adherence to weekly iron and folic acid supplementation.

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School Readiness for Weekly Iron Folic Acid Supplementation Program in Kota Depok: A Formative Study

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Keywords: School readiness · Weekly iron · Folic acid · Supplementation

Background/Aims: School based Weekly Iron Folic Acid Supplementation (WIFAS) program already implemented since 2016 in Indonesia to reduce anemia prevalence among school going girl adolescent. In fact, anemia prevalence among adolescent girls still highly persistent. This study was conducted to explore the gap between program implementation and national program guideline, as well as to investigate obstacles which may persist in the field particularly at school-based as forefront actors of this program. **Methods:** Using qualitative design this study involved stakeholders from health district staff, educational district officers, public health center services and school community (headmaster, teachers, and students) from selected schools which already acquire iron supplementation program. Data was collected by conducting interview, observation and document review. Data triangulation was implemented to validate data before results were presented. **Results:** There was a gap in WIFAS program implementation between the program national guidelines and in the field enactment. School community as an actor of school-based WIFAS had different perceptions and these led to unachieved targets, particularly in improving adherence to WIFAS consumption among adolescent school girls. Determinant factors of this gap perception were

knowledge, motivation, capacity and leadership dimensions of school community. School community readiness was imperative for implementing school based WIFAS program effectively. **Conclusion:** There was an urgent need for improving school readiness to implement school based WIFAS program.

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Micronutrient Adequacy in Rural Indian Children's Diets – Need for Country Specific Tools

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Keywords: Micronutrient adequacy · Probability adequacy · Nutrient adequacy ratio · Dietary allowance · Average requirement

Background/Aims: The estimated average requirements (IOM-EAR) and the reference dietary allowance (ICMR-RDA) of micronutrients (MN) are country specific. They are being applied to compute micronutrient adequacy. The probability of adequacy (PA) is the ratio of difference in mean intake and EAR and the standard deviation (SD); nutrient adequacy ratio (NAR) is the ratio of intake and RDA. The objective of the study was to assess the contextual applicability of both NAR and PA in computing micronutrient adequacy (MNA) of children's diets. **Methods:** The study was conducted in Medchal District, Telangana, South India. A 24-hr diet-recall (3 non-consecutive days) and biomarkers of micronutrient status (vitamin A, vitamin D, vitamin B12, folate, ferritin, hemoglobin) of 76 children were assessed using standardized methods. Nutrient intake from foods was calculated using in-house software (NIN). **Results:** The nutrients with comparable NAR (calculated using RDA) and PA (calculated using EAR) were: thiamine (86%; 83%), riboflavin (59%; 56%), niacin (64%; 73%), vitamin C (78%; 72%), zinc (74%; 80%); and with varying NAR and MAR were: vitamin A (52%; 14%), vitamin B12 (66%; 7%), folate (94%; 35%), iron (51%; 92%), calcium (53%; 0.26%). Mean NAR was 61% and mean PA was 51%. Only hemoglobin was associated with Mean NAR (r = 0.28, p < 0.01). Four B vitamins, vitamin C, and zinc showed similar micronutrient adequacy. However, iron, calcium, vitamin B12, and folate were at variance attributable to the skewed distribution of daily intakes. **Conclusion:** Critical understanding of the intricacies in computation is essential for their generalizability and contextual application.

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Correlation between Knowledge about Anemia and Iron and Folate Consumption with Anemia Status among Premarital Women in Bantul Regency, Yogyakarta

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Keywords: Women of premarital fertile age · Knowledge · Anemia · Iron intake · Folate intake

Background/Aims: Anemia is a condition in which the number of red blood cells or hemoglobin levels in the blood is less than normal. Anemia remains a major problem for global public health. The World Health Organization (WHO) estimates that anemia affected more than 1.62 billion people worldwide. Data from National Health Survey (*Riskesdas)* in 2013 shown that anemia prevalence was 21.7%. Yogyakarta Health Profile showed that the prevalence of anemia women of reproductive age has increased from 22.45% to 28.1% between 2010 and 2014, while in Bantul was 20% indicating a moderate public health problem. The objective of this study was to determine the correlation between knowledge, iron intake, and folate intake with anemia status among women of reproductive age in Bantul Regency. **Methods:** This research used cross sectional method. The samples were selected by using probability sampling method with simple random sampling technique by lottery and specifying inclusion and exclusion criteria. Data was analyzed with Chi-square test using SPSS. **Results:** The results showed that there was no correlation between knowledge level and anemia status. Anemia status was significantly correlated with iron intake, but not with folate intake. **Conclusion:** Anemia was associated with iron intake among women of reproductive age.

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Nutrition Education Using Food Monitoring Card and Multi-Nutrient Biscuit Interventions Improving Nutritional and Iron Status in Undernourished Children Aged 6–23 Months: A Cluster Randomized Control Trial in Aceh, Indonesia

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Keywords: Multi-nutrient biscuit · Food monitoring · Iron deficiency · Nutrition education · Underweight

Background/Aims: Undernutrition and iron deficiencies among under-five children in Indonesia remain high and very closely related to the inadequate complementary feeding. This study investigated the effect of weekly nutrition education by home visit using the food monitoring card (FMC) models, daily provision of biscuits and their combination on growth and iron deficiency and anemia among underweight children aged 6–23 months in Aceh, Indonesia. **Methods:** A 6-months, cluster randomized, controlled trial was conducted on 121 children receiving nutrition education (NE), multi-nutrients biscuit (MNB), combination both nutrition education and biscuits (NE+MNB), or control (no intervention). Weight gain and prevalence of underweight (weight for age z-score <-2 SD) were collected by anthropometric and iron deficiency by serum ferritin measurement using ELISA method. **Results:** After 6-months intervention, the weight gain in NE+MNB group was 1.51 ± 0.68 kg, the MNB group 1.40 ± 0.72 kg, NE group 1.34 ± 0.66 kg and control group 1.21 ± 0.42 kg; while serum ferritin was higher in NE+MNB and biscuit groups (2.54 μ/L and 2.17 μ/L). At the end of study there was a significant decrease in the prevalence of underweight (p = 0.003), the incidence of underweight in NE+MNB (45.2%) was lower than the NE group (63.3%), MNB group (64.5%) and control group (69.0%). There was a significant decrease of iron deficiency (p = 0.02), the incidence was lower in MNB group (6.5%) than in NE+MNB group (22.6%), NE group (23.3%) and control group (24.1%). **Conclusion:** The combination of nutritional education and multi-nutrient biscuits intervention improved nutritional status and reduced iron deficiency status among undernourished children.

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Increasing Knowledge on Supplementary Foods among *Posyandu* Cadres through Nutrition Education in Depok, Indonesia

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Keywords: Nutrition education · Cadre · Knowledge · Supplementary food

Background/Aims: Growth monitoring session at the Integrated Health Post (*Posyandu*) is held monthly implemented by cadre at the village to monitor child growth. Therefore, the role of cadres is very important so that sufficient knowledge is needed to convey nutritional messages to the community. The objective of the study was to assess knowledge on complementary feeding for under-five children among *Posyandu* cadres after following a one-day nutrition education. **Methods:** The design of the study was quasi experimental with the approach before and after nutrition education during one-day workshop. This study was conducted in five selected *Posyandu* in Depok City. Fifty-three cadres involved in one-day nutrition workshop and their knowledge was assessed before and after the workshop. Nutrition education used module that had been developed earlier. **Results:** The results showed that the average of age was 46 years old, with the range of 26–67 years old. Most of the cadres had high school education, and all of them were housewives. The average of pre-test score was 37.3 and the average of post-test score was 69.3; so there was an increase in score of 32 point or 86%. The biggest increase of scores was the recommended portion of staple food a day, while the smallest increase of score was the time of the first feeding of the

baby. **Conclusion:** The results of this study showed that nutrition education can provide positive results and could be applied to other *Posyandu*.

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Effect of Nutritional Counselling on the Energy Intake of Stunting Children Aged 4–6 Years

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Keywords: Stunting · Children · Nutritional counselling · Energy intake · Snack

Background/Aims: The purpose of this research was to determine the effect of nutritional counseling on the energy intake of stunting children aged 4–6 years. **Methods:** The research activities were held at As-Shofa and Al-Fityah Kindergarten of Pekanbaru city on April and August 2018. The subject of this research was stunting children aged 4–6 years (n = 20). The nutritional counseling was given to the subject's parents for four times. Each nutritional counseling was held ±30 minutes at the subject's home. The measurement of the subject's food consumption was done using the 1 x 24-hour food recall. Subject's parents were given a balanced nutrition book suited for children aged 4–6 years which contain information about the number, type, and timing of feeding the children. **Results:** Subject's average energy intake was 838.2 kcal or 52.7% of recommended energy intake. All subjects consumed energy below the recommended intake. As many as 66.67% of the subjects did not consume morning snack, 33.3% did not consume afternoon snack and 33.3% of the subjects did not consume night snack and 33.3% did not consume breakfast. Within four months of nutritional counseling, the energy intake increased from 52.7% to 71% of the recommended energy intake. **Conclusion:** The subjects' parents were expected to pay attention to the subjects' three-time snacks (morning, afternoon and night snacks) and breakfast.

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Fruit and Vegetable Consumption in Rural and Urban Areas of Yogyakarta Indonesia

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Keywords: Fruit and vegetable consumption · Dyslipidemia · Pre hypertension · Pre diabetic

Background/Aims: Low consumption of fruit and vegetables may increase the incidence of non-communicable diseases in lower and middle-income countries. The objective of the study was to explore the intake of fruit and vegetables in urban and rural areas of Yogyakarta. **Methods:** We used cross-sectional study and there were 385 participants selected by proportional stratified random sampling to represent the most populated area in urban and rural areas of Yogyakarta. We interviewed using food consumption pattern questionnaire, measured body mass index, waist to hip ratio, blood pressure, fasting blood glucose, and cholesterol level (HDL). **Results:** Mean daily fruit intake was 0.65 portion/day and mean daily vegetable intake was 1.59 portion/day both in urban and rural areas. The intake was below the WHO recommendation of minimally five servings of fruit and vegetables per day. The odds of having central obesity (waist and hip ratio) among women was 5.7 times higher than among men (74.6% vs. 33%, CI = 3.61–9.13). The prevalence of dyslipidemia (55.9% vs 44.1%), pre-hypertension (46.8% vs 53.2%), pre-diabetic (67.3% vs 32.7%) and overweight (54.5% vs 45.5%) were significantly higher in urban than in rural, respectively. No association between fruit and vegetable consumption with dyslipidemia, pre-hypertension, and pre-diabetic (p > 0.05). **Conclusion:** The risk factors of non-communicable diseases was significantly higher in urban than in rural areas and consumption of fruit and vegetables was generally low. There is a need to increase consumption of fruits and vegetables and to improve healthy life style to prevent non-communicable diseases both in urban and rural areas.

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Vegetable Dietary Pattern Associated with Low Risk of Preeclampsia Possibly through Reducing Proteinuria

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Keywords: Dietary pattern · Vegetable · Relative risk · Preeclampsia · Proteinuria

Background/Aims: Evidence on the potential roles of dietary patterns as risk factor for pre-eclampsia remains limited. The study aimed to examine the associations between dietary patterns during pregnancy and the risk of pre-eclampsia. **Methods:** We analyzed data from a cluster randomized controlled trial among 987 healthy pregnant women from three rural counties in northwestern China. Maternal diet during the whole pregnancy was assessed using a 107-item food frequency questionnaire with portion size before delivery. Principal component factor analysis with varimax rotation was used to identify common dietary patterns. Preeclampsia was diagnosed by trained clinicians and recorded in delivery records. **Results:** Nineteen participants (1.9%) were diagnosed with preeclampsia. Gestational hypertension and proteinuria were only weakly correlated with each other (Kappa = 0.06): 10.7% participants had gestational hypertension only, 8.8% had proteinuria only, and 1.9% had both, and 78.6% had neither. Five common dietary patterns were identified: i.e. vegetable, meat, fruit, snack, and wheat staple patterns. After adjusting for energy intake, other dietary pattern scores and baseline blood pressure, a higher vegetable pattern scores was associated with lower risk of pre-eclampsia (P for trend = 0.041; the highest vs. lowest quartile, adjusted relative risk = 0.20 [95% confidence interval, 0.04~0.98]). A similar association was also observed for the risk of proteinuria (P for trend = 0.015): the highest vs. lowest quartiles of the vegetable pattern score, adjusted relative risk = 0.44 (95% confidence interval,

0.24~0.80). **Conclusion:** Adherence to vegetable dietary pattern may be associated with a lower risk of pre-eclampsia, possibly through reducing development of proteinuria.

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Good Diet Knowledge Is Associated with Normal Cholesterol Levels in the Elderly Handayani Integrated Health Post (*Posyandu*) Juanda Samarinda

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Keywords: BMI · Abdominal circumference · Knowledge of eat pattern · Cholesterol level

Background/Aims: High cholesterol levels can cause very serious problems for health. Increased level of cholesterol due to poor diet was associated with BMI and high abdominal circumference. The study aimed to determine the relationship between BMI, abdominal circumference and knowledge of diet with cholesterol levels. **Methods:** This research was a quantitative method with a correlation approach. Sampling in this study used a total sampling technique involving all 41 people elderly members of Handayani Health Center *Posyandu* for elderly in Juanda, Samarinda. Total cholesterol was analyzed by fingerpicks blood test using portable device of AccuCheck. Statistical test used product moment correlation test to assess the relationship between variables. **Results:** The results showed that the percentage of elderly with high cholesterol (> 240 mg/dl) was 12.3%, being overweight (BMI ≥23 kg/m^2) was 87.4%, being central obesity (abdominal circumference >90 cm for men and >80 cm for women) was 90.2%, and with good knowledge on eating pattern was 90.2%. The study showed that there was no significant relationship between BMI, abdominal circumference with cholesterol levels, but there was a relationship between knowledge of dietary patterns with cholesterol levels. **Conclusion:** Knowledge of diet was correlated with cholesterol level, while nutritional status not.

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The Influence of Nutrition Education with the Media Booklet among Mothers to Increase Food Intake of Stunting Toddlers in Riau, Indonesia

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Keywords: Stunting · Toddler food intake · Booklet · Nutrition education

Background/Aims: One of the many nutritional problems among toddlers occurring in developing countries including Indonesia is stunting. One of the factors affecting stunting is the low level of mother's nutrition education. The study aimed to analyze the effect of nutrition education with the media booklet on increasing food intake among stunting toddler. **Methods:** The design of the study was Quasi Experimental. The study was conducted from March-July 2018 in Kampar subdistrict, Riau. The intervention was carried out for 2 months. The study subjects were all toddlers identified as stunting in Kampar subdistrict (n = 60) and then divided into intervention group and the control group. The data was processed and analyzed using linear regression. **Results:** The average intake of protein, calcium and phosphorus in the intervention group (protein 24 ± 3 g to 36 ± 3 g, calcium 600 ± 123 mg to 950 ± 133 mg, phosphorous 350 ± 123 mg to 498 ± 133 mg) was higher than in control group (protein 24 ± 3 g to 25 ± 3 g, calcium 60 ± 123 mg to 650 ± 133, and phosphorous 355 ± 133 mg to 350 ± 123 mg), which were significantly different (p = 0000). The linear regression showed that 57% of the nutritional knowledge of mothers more influenced by increased toddlers' food intake and 43% were influenced by other factors not examined. **Conclusion:** Knowledge of nutrition is one of the factors that can affect food intake on toddlers.

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Lean Mass, Fat Mass and Bone Mineral Density in Pre-Pubertal Malaysian Children

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Keywords: Lean mass · Fat mass · Bone mineral density · Prepubertal children

Background/Aims: Body weight is a main determinant of bone mineral density (BMD), however whether lean mass (LM) or fat mass (FM) is a more important contributor to BMD remains a controversial issue in growing children. We determined the associations between baseline LM, FM and bone status of 243 pre-pubertal Malaysian children aged 9 to 11 years old (Tanner Stage 1 & 2) participating in the effects of prebiotic fiber on bone health (PREBONE-Kids) study. **Methods:** Total body and lumbar spine (L1-L4) bone mineral density (BMD), bone mineral content (BMC) and body composition were measured by dual-energy X-ray absorptiometry (DXA). **Results:** There was no significant difference in FM between boys and girls (10.97 ± 7.93 kg vs. 10.84 ± 6.00 kg, p = 0.890). However, boys had significantly higher LM compared to girls (22.50 ± 5.38 kg vs 20.99 ± 5.09 kg, p < 0.05). LM showed stronger correlation to total body BMC (r = 0.919, p < 0.01) and BMD (r = 0.745, p < 0.01) compared to fat mass (BMC r = 0.756, p < 0.01, BMD r = 0.669, P < 0.01). Multiple linear regression analysis, after correcting for multi-collinearity, showed a significant association between LM and BMD (r2 =0.555, p < 0.001). LM was significantly associated with BMD in all subcategories of thinness (r2 =0.371, p < 0.003), normal (r2 = 0.293, p < 0.001), overweight (r2 =0.451, p < 0.001) and obese children (r2= 0.369, p < 0.001). **Conclusion:** In conclusion, LM is a significant predictor

of BMD compared to FM even in obesity. This suggests the importance of increasing LM for bone mass acquisition among pre-pubertal Malaysian children to optimize peak bone mass.

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Hidden Hungers of Camden: A Pilot Intervention Unravelling the Double Burden of Malnutrition among Ethnic Minority Women Living in Deprivation

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Keywords: Micronutrients · Intervention · Women · Malnutrition

Background/Aims: Women are generally more at risk for nutritional deficiencies and poor health due to gender bias and systematic discrimination; placing them at a lower worth in society than men. This study addresses research gaps that include lack of data of nutritional status for these ethnic minority women groups living in the UK and subsequently limited tailored nutrition interventions targeting them. **Methods:** Using a mixed methods approach, (quantitative and qualitative study design) this study explores the phenomenon of demographics and socio-economic status and its impact on nutrient intake among ethnic minority women. **Results:** Based on 24-hour dietary recalls, used as main nutritional assessment tool, average mean nutrient intake were lower range of the normal value of recommended UK reference values for nutrients; calcium, folic acid (vitamin B9), iron, magnesium, potassium, and vitamin D. Validated health and eating habits questionnaires also identified poor dietary habits and food choices among cohort. Results from the study reveal a double burden of malnutrition. **Conclusion:** Developing culturally tailored nutrition interventions which include skills based healthy cooking courses and nutrition education could positively increase micronutrient intake among those suffering from hidden hungers.

898

Effect of Kale (*Brassica oleracea*) Juice on Physical Development of the Children in Elementary School

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Keywords: Kale · Physical development · Schoolchildren · Vietnam

Background/Aims: Kale is a vegetable that contains plenty of vitamins, minerals, and antioxidative components. The objective of this study was to evaluate the effects of long-term consumption of kale on children's growth and health. **Methods:** A total of 602 healthy children were selected at random from two elementary schools in Hanoi, and divided into two groups. An intervention group consumed kale juice for approximately 8 months, while the control group did not. Pre- and post-intervention measurements of the children's height, weight, decimal visual acuity, and grip strength were recorded, and the cumulative incidence rate of upper respiratory tract infections (URTI) were evaluated. **Results:** Children in the intervention group exhibited significant development in height (0.22 cm, 95% CI; 0.09–0.36, p < 0.01), weight (0.41 kg, 95% CI; 0.15–0.66, p < 0.01), and grip strength (0.48 kgf, 95% CI; 0.24–0.72, p < 0.01) compared to that of the control group. Furthermore, the number of the children with poor unaided visual acuity was significantly decreased in the intervention group at the end of the study (<1.0). The cumulative incidence rate of URTIs and days of morbidity were also significantly lower in the intervention group. **Conclusion:** These results suggest that the kale juice have beneficial effects on the growth and health of the children in elementary school.

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Effectiveness of Design Thinking Model in Elementary Weight Management Nutrition Education

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Keywords: Nutrition education · Weight management · Design-thinking

Background/Aims: According to Taiwan Student Health Checkup investigation, the ratio of overweight and obesity among elementary school students was 28.7%. Unhealthy eating habits and lack of exercise are the main causes of obesity. In recent years, the government committed to promoting school as health supportive environment, with important variety of nutrition education. However, it is acknowledged that it was hard to achieve the behavior change. **Methods:** To our knowledge, this is the first study integrating nutrition education with design thinking, i.e. create educational course; knowledge with gamification, strengthen the motives for change, practice in daily life to benefit students' learning and absorption as a creative idea, and comprehensively support students to establish a healthy lifestyle. Target of intervention were students of the 4th-6th grade in elementary school for 6 weeks. Combining Inbody270 body composition analyzer was used to evaluate body composition. **Results:** After the intervention, students had significantly lower BMI by –0.38 ± 0.55 kg/m^2, body fat -0.90 ± 1.16 kg, and body fat percentage –1.43 ± 1.47%. Furthermore, the height was significant increased by 0.90 ± 0.78 cm and muscle mass +0.47 ± 0.53 kg. The dietary analysis showed that there was no significant difference in the average caloric intake and the percentage of the macronutrients. However, among the six food category, the intake of fruits, vegetables and dairy products increased. The intake of whole grain, meat, oil and nut seeds has a tendency decreased. **Conclusion:** Innovative interactive courses can increase the compliance of students in learning. Inclusion of body composition measurement can accurately assess the effectiveness of school students' weight management.

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The Attitudes Toward Dietary Supplement Use among Active and Passive Supplement Users of Japanese High-School Students

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Keywords: Dietary supplement · High-school students · Internet survey

Background/Aims: According to children's mothers, the prevalence of dietary supplement use in Japanese high-school students was 29.2%. However, high-school students are also in the life-stage of establishing their own perspectives. Therefore, we conducted a survey on high-school students directly to compare active and passive users of dietary supplements. **Methods:** An internet survey was conducted to 46,019 registrants of high-school students aged 15 to 18 years old in December 2017. A total of 1,031 (boys: 276, girls: 755) eligible responses were collected. The questionnaire was based on the previous report administered to mothers. The purpose and information sources of supplement use as well as adverse event experience were compared between active and passive users. **Results:** The prevalence of active supplement users was 42.4% in boys and 43.8% in girls. Boys used supplements for health regardless of active or passive use. More active users (40.9%) of girls used supplements for weight-loss than passive users (20.4%); the corresponding prevalence was 2.3% in our previous report with the mothers' understanding of their daughters. The most frequently accessed information source for active users was Internet whereas the one for passive users was family. The frequency of adverse events was 9.4% in boys and 14.4% in girls; the gastrointestinal symptoms were mostly experienced, and some girls reported the allergy-like skin manifestation, fatigue and palpitations. **Conclusion:** Our results suggest the education of nutrition and supplements should be provided to high-school students to inform the inappropriate use or the use of fraudulent products may be harmful to their health.

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Correlation Between Body Mass Index (BMI), Total Body Fat, Waist Circumference, Mid-Upper Arm Circumference (MUAC) with Central Obesity among Tea Worker Women

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Keywords: Body fat · MUAC · Central obesity

Background/Aims: Obesity is a global epidemic problem. More than 1 billion adults are overweight and more than 3 hundred million people are obese. In Indonesia, 15.4% adults are obese and 32.9% adult women are obese. Obesity can be measured by body mass index (BMI), total body fat, waist circumference, mid-upper arm circumference (MUAC) and visceral fat. The aim of this study was to analyze the correlation between body mass index (BMI), total body fat, waist circumference, mid-upper arm circumference (MUAC) with central obesity. **Methods:** This was a cross-sectional design conducted in Bandung, West Java, Indonesia. A total of 106 tea worker women in NHF tea plantation participated in the study. Data were obtained by measuring height, weight, waist circumference and mid-upper arm circumference and total body fat was measured with bioelectrical impedance analysis. Spearman correlation was used to analyze the correlation between variables. **Results:** The results showed that the average BMI was 26.1 ± 3.7 kg/m^2, total body fat was 31.4 ± 4.8%, waist circumference was 83.8 ± 10.9 cm, MUAC was 29.1 ± 2.8 cm and visceral fat level was 8.1 ± 3.7 kg. Meanwhile, the number of centrally obese woman workers from visceral fat measurement was 18 (17%). Spearman correlation test have found that body mass index (BMI), total body fat, waist circumference, and mid-upper arm circumference (MUAC) were positively correlated with central obesity (p < 0.01). **Conclusion:** This study shows that central obesity can be measured by body mass index (BMI), total body fat, waist circumference, mid-upper arm circumference (MUAC).

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Dietary Pattern and Traditional Food Consumption (*Soami*) among Pregnant Women in West Seram Regency Maluku

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Keywords: Traditional food · Eating culture · Soami · Pregnant women

Background/Aims: It is essential to pay attention to the food consumption among pregnant women due to the increasing nutritional requirements in this period. Eating culture factor may also influence the food consumption pattern, such as *Soami*, a food made solely from cassava, consumption habit. This study aimed to identify how often pregnant women consumed *Soami* as well as to measure their overall food intake. **Methods:** The study was a cross-sectional analysis among 44 pregnant women in West Seram Regency conducted during April 2018. Using a semi-quantitative food frequency questionnaire (Semi quantitative FFQ), *Soami* consumption data was collected from participants. Dietary intakes, both macro- and micronutrients, were also measured in this study. **Results:** The average of respondents was from middle to lower socio-economic (>Rp 1.000.000) which was 63.6%. About 95.4% of pregnant women consumed Soami 2–3 times/day, and the rest once a day, while merely 18.2% of respondents consumed rice at least once a day. All macronutrient intake, such as energy, protein, fat, and carbohydrate, were below 75%, while only Vitamin A, Vitamin C, and Vitamin B6 reached a dietary recommendation. Consumption of Soami may contribute to the low dietary intake of pregnant women because this food was consumed every day and not combined with other foods. **Conclusion:** It is essential to provide education

for those who live in this area and have the habit of consuming *Soami* regarding the combination of *Soami* with other foods during their meals to meet their nutritional requirements.

903
The Difference of Energy and Macronutrient Intake based on Nutritional Status among Adult Women in West Jakarta

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Keywords: Adult woman · Energy · intake · Macronutrient
Background/Aims: Indonesia is facing both under nutrition and overweight problems. The prevalence of obesity tends to increase with age. Based on the result from National Health Survey (*Riskesdas* 2013), the prevalence of obesity in Indonesian woman is 32.9%. One of the main factors of obesity is over eating. The objective of the study was to analyze the difference of energy and macronutrient intake between adult women with normal and overweight nutritional status in Kebon Jeruk, Jakarta. **Methods:** This study used a cross-sectional design with random sampling. This study included 711 adult women. Nutritional status was analyzed using body mass index, while energy, carbohydrate and fat intake was obtained from 24-hour food recall. **Results:** Study showed that 85.5% of adult women were overweight. The mean daily consumption of energy in adult women with normal nutritional status was 2133 ± 329 kcal, while among overweight women was 2147 ± 277 kcal. Average fat consumption in adult women with normal nutritional status was 73.8 ± 8.0 g and 74.6 ± 9.8 g in overweight women. Average carbohydrate consumption in adult women with normal nutritional status was 265.9 ± 78.0 g and 257.6 ± 82.9 g in overweight women. The study showed there was no significant difference in energy intake and macronutrient in adult women with normal nutritional status and overweight. **Conclusion:** Energy and macronutrient intake was not correlated with the nutritional status of adult women.

904
Relationship of Adherence to the Mediterranean Diet with CUN-BAE Index in Spanish Elderly in Rural Areas

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Keywords: Mediterranean diet adherence · CUN-BAE · Body fat
Background/Aims: CUN-BAE (Clínical Universitaria de Navarra – Body adiposity estimator) is a new adiposity index to predict body fat% based on age, sex, and body mass index (BMI). The study aimed to relate the degree of adherence to the Mediterranean diet with CUN-BAE index among Spanish rural elderly. **Methods:** This cross-sectional study investigated a consecutive sample of 266 healthy elderly (96 males and 170 females; age mean 72 ± 6), who had lived in rural areas of Cáceres (Spain). CUN-BAE was calculated as $-44.988 + (0.503 \times age) + (10.689 \times sex) + (3.172 \times BMI) - (0.026 \times BMI2) + (0.181 \times BMI \times sex) - (0.02 \times BMI \times age) - (0.005 \times BMI2 \times sex) + (0.00021 \times BMI2 \times age)$ where male = 0 and female = 1 for sex, and age in years. A validated 14-item questionnaire (PREDIMED: PREvención con DIeta MEDiterránea) was used for assessing the degree of adherence to the Mediterranean diet (MD). The questionnaire considers low adherence to the MD at scores ≥9. **Results:** Of the whole population, 141 (53%) participants had low adherence to the MD. We found significant differences between the groups of low and high MD adherence with respect to BMI (31.19 ± 5.46 vs 27.95 ± 4.21; p < 0.001) and CUN-BAE (42.01 ± 7.50 vs 38.01 ± 7.47; p < 0.001). After adjusting by age, sex, smoking and level of physical activity, these differences were maintained. Correlation between CUN-BAE and MD adherence was significant (r = –0.160; p = 0.009). **Conclusion:** CUN-BAE was related to degree of adherence to the MD. Participants with low adherence to the MD obtained higher values. This work was supported by the 4IE project (0045-4IE-4-P) funded by the Interreg V-A España-Portugal (POCTEP) 2014-2020 program.

905
An Integral Virtual Tool for Food Research From Social Sciences

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Keywords: Nutrition · Aging · Technology · Research · Health
Background/Aims: Research on food habits and consumption has been carried from different methodologies that proposed a multiplicity of tools taken from quantitative and qualitative methodologies. In the studies on food we find from ethnographic proposals with the use of the techniques closest to Anthropology, to 24 h or 72 h Menu Recall or self-administered questionnaires closer to research that seek to know the intake of nutrients or certain data on anthropometric measures. The epistemological reflection on the validity and limitations of each methodological option has been strongly discussed in the scientific literature on this subject. This work was supported by the 4IE project (0045-4IE-4-P) funded by the Interreg V-A España-Portugal (POCTEP) 2014-2020 program. **Methods:** This text deals with the methodology followed for the design of a mobile application focused on the production of empirical materials in food research. **Results:** It is a multi-device data collection application that includes aspects of consumption and feeding practices in different time versions of Menu Recall, space for data collection in a Household Food Inventory designed by the team of researchers and the ability to collect notes, audios, videos, photographs and all types of audiovisual material derived from the fieldwork and the participating observation. The multi-device tool designed to collect all this information through various

electronic media such as Smartphone or Tablet. **Conclusion:** The aim of this tool is to facilitate the collection and organization of work for subsequent analysis through software such as ATLAS.ti or NVivo, with a simple graphical interface and easy to use.

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Evaluation of Stunting-Related Health Programs in Stunting Alleviation in Ketapang, West Kalimantan, Indonesia

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Keywords: Stunting · Action research · Evaluation study
Background/Aims: To alleviate stunting, the Ministry of Health has implemented 11 stunting-related health programs in Indonesia. This study aimed to evaluate and further recommend the improvement for health programs for stunting alleviation in Ketapang, West Kalimantan, one of the regency with high prevalence of stunting. **Methods:** This was a program evaluation study using mixed qualitative-quantitative approach. For data collection, we conducted in depth interview, observation, and document review of stakeholders' data from district level to the village level. One hundred mothers from ten villages which represents geographical variation were chosen as respondents and were asked using standard questionnaires. **Results:** There was lack of feedback documentation from district to primary health centers (PHC) and from PHC to village midwife. At village and sub-district level, nutrition officer and village midwife were overloaded with all the programs and their own routine tasks, so that program implementation was not optimal. There was lack of synchronization between various nutrition related health programs and coordination. Moreover, the coverage area of the program and targeted beneficiaries were wide, thus the targeted beneficiaries felt they need more information about the program they received. **Conclusion:** To optimize stunting related health programs, more human resources are needed. Additionally, a better established and synchronized report and evaluation mechanism should be developed to monitor and evaluate the program implementation.

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Remaja ASIK: The Effect of Optimized Food Based Recommendations on Cognitive Performance among Adolescent Girls

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Keywords: Adolescent girls · Cognitive performance · Hemoglobin level · Optimized food-based recommendations
Background: School based program have beneficial effect on healthy lifestyle behaviors, psychosocial outcomes, and academic performance in adolescents. However, the effectiveness of optimized food-based recommendations (FBRs) developed using linear programming approach has never been studied in adolescent girls. The aim of this study was to assess the effect of optimized FBRs on cognitive performance among adolescent girls. **Methods:** A 20-week intervention was performed in Malang District, East Java, Indonesia, among 239 adolescent girls aged 14–18 years. Optimized FBRs was developed using linear programming and "Remaja ASIK" is the Indonesian tagline for this study which means Active, Healthy, Smart, and Creative. Cognitive performance was measured in this study using Digit Span, Coding, Intelligence Structure Test (IST), Raven's Standard Progressive Matrices (RSPM), and included attention, short-term memory, processing speed, and predictive IQ. Outcome variable were analyzed by repeated measures general linear model test. **Results:** After intervention, hemoglobin level decreased in both group ($p > 0.05$). None of cognitive tests were significantly different between groups, either in baseline or endline after adjusted for predictive IQ. However, digit span forward in intervention group increased by one point but no change was observed in the control. While there was no significant difference between groups on cognition, the intervention group tend to benefit in attention and short-term memory. **Conclusion:** The lack of effect on cognition may be attributable to the fact that most of subjects had mild but not moderate/severe anemia.

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Street Foods Can Be a Source of Livelihood for Women in Tangerang, Indonesia and Hat Yai, Thailand

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Keywords: Street foods · Women vendors
Background/Aims: Nowadays, street foods have become increasingly popular all over the world, including Indonesia and

Thailand. In these countries, street food vending are easily found in many places, particularly in urban areas. It is one of the few readily accessible avenues of open employment for women who need to earn a living. The low costs of entry into many types as well as schedule flexibility are attractive factors for many women. The research aims were to assess the profitability of the street food business, runs by women in Tangerang, Indonesia and Hat Yai, Thailand, the received income, the gained profits and the role of the income in households' livelihoods. **Methods:** The study included a quantitative questionnaire and qualitative interviews. The sample consisted of 200 street food vendors in Indonesia and 96 in Thailand. **Results:** The women, aged 20 to 50 years, were the dominant groups in both cities. Most of the street food enterprises were the sole livelihood source for the households. The husbands of many women were unemployed, sick, disabled or dead. The profit per day of Tangerang female traders was IDR 322,380, whereas in Hat Yai 1,325 THB (1 USD = 14,000 IDR = 32 THB). There was a significant association between study locations, income and profit per day (ANOVA p < 0.05). The interviews showed most vendors did not belong to any street food vending association. The facilities for meal preparing were not constantly monitored to ensure good hygienic practices. **Conclusion:** The local government should extend its efforts to the street food sector and provide training and education for female street food vendors.

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Effects of Soft Drink Consumption on Serum Lipid Profile

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Keywords: Soft drink · Serum lipid profile · Apolipoprotein A1 · Adulthood

Background/Aims: Soft drink consumption is associated with the risk of chronic diseases. However, there is inconsistent evidence on lipid serum profile. Given this gap in the literature, we examined the association of soft drink consumption with serum lipid profile in Chinese adults. **Methods:** The wave of data in 2006 was collected from the China Health and Nutrition Survey. Total cholesterol (TC), triglycerides (TG), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C), apolipoprotein A1 (APOA1), apolipoprotein B (APOB) and Lipoprotein (a) (Lp[a]) in fasting serum were measured. The association between soft drinks and serum lipid among Chinese adults was assessed by multilevel level logistic regression, and the model was adjusted for age, gender, education, smoke, drink, BMI and energy intake. **Results:** A total of 5,813 participants aged 17–95 years were included in this study. Of the total subject, 1,132 (19.47%) participants consumed soft drink last year. TC was abnormal in 19.68%, TG in 32.75%, LDL-C in 47.89%, HDL-C in 24.11%, APOA in 63.89%, APOB in 14.55%, Lp[a] in 14.02%. Multilevel level logistic regression showed that soft drink group had elevated APOA than non-drink group (p < 0.01, odds ratio: 1.278). After controlling for potential confounding variables, the odds ratios (95% confidence intervals) for APOA1 was 1.267 (1.081~1.484) and p value was 0.004. **Conclusion:** This was the first study to demonstrate that consumption of soft drink was associated with higher APOA1. These results suggest that the effect of soft drink on chronic diseases may be through APOA1. Furthermore, additional studies are needed to confirm the findings.

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Determinants of Stunting among Infants 0–11 Months Old in Outermost Area of Indonesia: A Follow Up Study in Sambas District, West Kalimantan

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Keywords: Stunting · Infants · Determinant · Borderline area

Background/Aims: Childhood stunting remains a big concern as it is associated with sub optimal brain development, decreased future earnings, and increased risk of metabolic diseases during adult life. Sambas, one of the outermost districts in Indonesia, has high prevalence of stunting. Based on the previous formative study in 2016 among pregnant women, several maternal factors lead to poor birth outcome, thus leading to childhood stunting. The study aimed to assess factors contributing to stunting, from conception until infancy. **Methods:** This study was a follow-up study on pregnant women focusing on stunting in infant aged 0–11 months with 559 participants involved. The pre-natal and post-natal determinants of stunting were analyzed using multivariate analysis using logistic regression. **Results:** In this study, prevalence of stunting was 20.8%. Low birth weight (OR = 2.867 95% CI (1.151–7.141), p = 0.024), diarrhea (OR = 2.642 95% CI (1.3525.163), p = 0.004,) and poor knowledge on Infant Young Child Feeding (IYCF) (OR = 2.046, p = 0.041) were shown to be significantly associated with stunting. Short maternal stature (OR = 1.905 95% CI (0.971–3.734), p = 0.061) and preterm birth (OR = 2.312 95% CI (0.886–6.033), p = 0.087) were assumed to be the confounding factors. Furthermore, low birth weight was the factor that have strongest association with stunting. **Conclusion:** Both prenatal and postnatal factors were associated with stunting, hence preventive measures should take both factors into account.

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Coverage and Adherence of Weekly Iron Folic Acid Supplementation among School Going Adolescent Girls in Indonesia

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Keywords: Adolescent · Adherence · Coverage · Iron

Background/Aims: The Weekly Iron Folic Acid (WIFA) supplementation program for school going adolescent girls are being gradually implemented by Indonesian Government since 2016. The objective of this study was to assess the coverage and adherence toward the WIFAS among school going adolescent girls, as part of a baseline assessment of an intervention to strengthen the new intervention. **Methods:** A cross-sectional survey was conducted in East Java (EJ) and East Nusa Tenggara (ENT) in year 2018. Total schools involved were 60 high schools from 20 districts. The data collection was done by using a semi self-administered questionnaire. **Results:** The total number of respondents in EJ and ENT was 934 and 922 adolescent girls respectively, with the mean age was 17 years old. The percentage of girls who reported to receive WIFAS tablet in the last six months was only 10% in ENT and 31% in EJ. The average number of IFA tablet received was only 0.4–1.4 tablets in the last 6 months. Adolescent girls who consumed at least 1 tablet was only 9% in ENT and 18% in EJ. The average number of tablets consumed in the last six months was only 0.4–0.7 tablet. Most of the girls stated that they did not consume it because they forgot; did not think it was necessary; and feared of side effects. **Conclusion:** The low coverage and adherence to iron supplement requires government attention to improve the supply, procurement and distribution system. Raising the awareness about the potential need for and benefits of WIFA supplementation are key components to strengthen demand.

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On the Mastery Degree of Specialist Personnel in Specific Health Guidance of Each Field in Japan

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Keywords: Specific health guidance · Trainer · Dietician

Background/Aims: Specific Health Checkups and Specific Health guidance focusing on lifestyle diseases was began in 2008 in Japan. Specific health guidance consists of three stages of subject education. In two stages, the subject will set goals for prevention of lifestyle diseases with specialist personnel. According to the guideline, doctors, health nurses and administrative dietician supposed to be in charge of it, however the guidance covers the entire spectrum of lifestyle, hence it is necessary to give guidance outside of their specialty. Therefore, the purpose of this study was to figure out the constraints faced by specialist personnel, especially health nurses and administrative dieticians. **Methods:** Candidates were thirty health nurses and forty-eight administrative dieticians involved in specific health guidance. The questionnaires were used to conduct their own proficiency degrees in the field of diet, exercise, smoking etc. covering 38 items by scoring low (1) to high (4) self-evaluation. The study period was from July to September 2018 and SPSS ver.22 was used for the analysis. **Results:** There was significantly different between health nurses and administrative dieticians in mastery degree of cooking, usage of prepared food and lifestyle diseases. It seemed that different health specialist experienced different constrains depending on their specialty and specific health guidance. **Conclusion:** In the future, it is necessary to consider the contents of the training considering items with low mastery degree of acquisition according to the difference of the special field depending on the background of specialist personnel.

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The Association of Food Insecurity, Depression, and Diabetes among Indonesian Adults: Results from Indonesian Family Life Survey 2007–2014

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Keywords: Food insecurity · Depression · Diabetes · Mediation analysis

Background/Aims: Food insecurity has been linked to chronic diseases while little is known about the association between food insecurity, depression, and diabetes incidence among adults. **Methods:** Data were obtained from 3955 adults who participated in the Indonesia Family Life Survey (IFLS) in 2007 and 2014. Food insecurity was assessed using a World Food Programme (WFP) concept based on a food consumption score analysis using the ten items of food frequency questionnaire (FFQ). Depression was assessed using self-reported of ten items Center for Epidemiologic Studies Depression (CES-D) questionnaire. A generalized estimating equation (GEE), mediation analysis, and Sobel-Goodman test were used to test the hypotheses model while accounting for the health behaviors and sociodemographic characteristics in this study. **Results:** Food insecurity was positively associated with depression in the unadjusted and adjusted model (p = 0.002–0.043). Food insecurity was negatively associated with diabetes in both model (p = 0.005 – < 0.001). The depression was positively associated with diabetes also in both models (p = 0.004 – < 0.001). The beta coefficients were decreased (from −0.0104 to −0.0099, p < 0.05) after the depression was added into the model. The formal mediation analysis was showed that depression was significantly mediated the pathway between the food insecurity and diabetes (p < 0.001). **Conclusion:** The effect of food insecurity on diabetes

is mediated, partly through the depressive symptoms. Strategies to improve the prevention of diabetes among adults may need to include the depression and food security together with the enrichment of nutrition education.

914

Differences on Energy and Macronutrient Intake after HIIT and Aerobic Training among College Student in Jakarta

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Keywords: HIIT · Aerobic · Energy · Macronutrient · Intake
Background/Aims: Nowadays, developing countries, including Indonesia, are facing overweight and obesity problems. This problem is related to lack of physical activity and high nutrient intake. There is a growing interest on diet and exercise especially among young adults. However, sometimes inappropriate diet and exercise have adverse effect on health. This study was conducted to determine whether routine exercise will change energy and macronutrient intake among college students in Jakarta. **Methods:** Twenty-nine college students were randomly assigned to 7 consecutive days HIIT and Aerobic training groups. The 24-hr Food Recall was used to assess nutrient intake pre and post intervention. Independent T-test was performed to analyze the differences in nutrient intake. **Results:** Energy, protein and fat intake were slightly decreased after intervention, while carbohydrate intake increased. Based on analytical statistic, there were no significant differences on energy, protein, fat, and carbohydrate intake before and after HIIT and Aerobic intervention. ($p > 0.005$). **Conclusion:** HIIT and Aerobic interventions for 7 days did not alter energy and macronutrient intake.

915

The Relationship between Sedentary Behavior, Refined Carbohydrate Intake, and Obesity among Employed Adults in Indonesia – A Population-Based National Study

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Keywords: Obesity · Sedentary behavior · Refined carbohydrate · Employed adults
Background/Aims: Long duration of sedentary behavior and high intake of refined carbohydrate among employed adults lead to an increased obesity risk. Only a few studies compared obesity risk factors among office workers and non-office workers. This study aimed to investigate the association between sedentary behavior, refined carbohydrate intake and obesity risk. **Methods:** This study used secondary data from 2013 National Health Survey

(*Riskesdas*) to analyze 319,443 employed adults (19–55 years with body mass index 18.5–40 kg/m^2) using logistic regression. The data included age, gender, educational level, body mass index, sedentary behavior, and refined carbohydrate (bread, biscuits, sweets, noodle, instant noodle) intake. **Results:** The proportion of overweight and obesity were 41.25% and 17.58% in office workers, significantly higher than non-office workers (35.30% and 11.93%). Long sedentary behavior was associated with obesity risk, not only among office workers (OR = 1.053, CI = 1.004–1.105), but also non-office workers (OR = 1.303, CI = 1.263–1.344). Also, after adjusted with age, gender, and educational level, sedentary behavior (OR = 1.24, CI = 1.21–1.28) and high bread intake (OR = 1.32, CI = 1.25–1.38) were associated with obesity risk among non-office workers. However, among office workers, sedentary behavior and refined carbohydrate intake were not associated with obesity risk. Age, gender, and educational level were a significant confounder in the relationship between sedentary behavior, refined carbohydrate, and obesity risk. **Conclusion:** Intervention to improve physical activity and dietary intake should consider age, gender, and educational level, particularly among office workers.

916

Impact of Web-Based Health Promotion Program and Online Nutrition Education Intervention for Metabolic Syndrome Patients: Effects on Lipid Profiles and Inflammation

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Keywords: Metabolic syndrome · Online nutrition education · Health promotion program · Triglycerides
Background/Aims: The prevalence of metabolic syndrome increases rapidly in Taiwan. One of the causes of metabolic syndrome is an unhealthy diet. Lifestyle modification, including dietary pattern, may improve the metabolic parameter of metabolic syndrome. We investigated the effectiveness of web-based health promotion and online nutrition education to improve metabolic parameter compared with paper-based nutrition education in metabolic syndrome patients in Stroke Prevention Center, Shin Kong Hospital, Taiwan. **Methods:** A total of 105 adults aged 37–83 years who met diagnostic criteria for the metabolic syndrome (NCEP ATP III), were randomly assigned to either online nutrition education group or paper-based nutrition education group during a 12-week intervention study period. A baseline and a postintervention blood samples were obtained from the intervention and control group. Finally, 98 participants completed a 12-week intervention study. The primary endpoint of the study was a change in lipid profile, such as triglycerides, HDL, LDL, and cholesterol level; and inflammation, such as high-sensitivity C-reactive protein (Hs-CRP). The secondary endpoints were changes in metabolic risk factor such as blood pressure. **Results:** Participants

in online nutrition education group showed a significantly lower reduction in triglycerides (−13.9 ± 42.4 mmol/L), Hs-CRP (−0.2 ± 0.6 mg/dL), and systolic blood pressure (−4.1 ± 11.9 mm Hg) at the end of the 12-week program (p < 0.05). **Conclusion:** Web-based health promotion program and online nutrition education were useful tool to improve lipid profile and inflammation in metabolic syndrome patients. This program may be useful for community and clinical setting.

917

Water Quality For Young Children in Cambodia—High Contamination at Collection and Consumption Level

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Keywords: Cambodia - Children under 5 years of age – Coliform - E. Coli - Quality

Background/Aims: Unsafe drinking water is a leading cause of child morbidity, especially among young children in low-income settings. **Methods:** We examined the quality of drinking water at point of collection and use in 796 households in three provinces, in Cambodia. Microbiological testing for coliform and Escherichia coli contamination was conducted for samples collected. Bivariable and multivariable logistic regression were used to examine associations between various factors and deterioration in water quality (increase in the risk according coliform or E.coli concentration) between point of collection and use. Contamination with both coliforms and E.coli was higher at point of use than at point of collection, with contamination at point of collection to account for 76.6% (coliforms) and 46.3% (E.coli). **Results:** Results suggest that child drinking water represents a considerable pathway for the ingestion of pathogens, in Cambodia. Area of residence, seasonality, type of water source, and water chlorination were associated with coliform concentration between the point of collection and use, whereas only seasonality was associated with E. coli contamination (OR = 1.46; 95% CI [1.05, 2.02]). Children living in rural settings were two times more likely to drink water with a deteriorating coliform concentration between the two-time points than children living in urban settings (OR = 2.00; 95% CI [1.22, 3.30]). The increase in coliform and E. coli concentrations between point of collection and point of use indicates that water contamination mostly occurs within the household. Strengthening national legislation on water quality standards and promoting safe water management at the household are needed.

918

Relationship between Chewing Tobacco and Food Consumption with Iron Concentration in Breastmilk of Lactating Mothers in Karo District Sumatera Utara Province

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Keywords: Chewing tobacco · Food consumption · Iron concentration breastmilk · Lactating mothers

Background/Aims: Breastmilk is the main food for babies to meet the nutrition needs. Various studies have shown that breastmilk quality is determined by the nutritional intake of lactating mothers. Based on this, the nutritional status and food intake of breastfeeding mothers determine the breastmilk production and quality. The nutritional problems in infants and lactating mothers are thought to be eating habits that are not good for the mother or the quality food that is not good for the baby. Smoking and chewing tobacco in Indonesia are mostly carried out, including by lactating mothers. Nicotine in tobacco is a carcinogen that causes the risk of bladder cancer, constriction of blood vessels, anorexia, increased heart rate and blood pressure. This study aims to analyze the relationship between chewing tobacco habit and food consumption with iron concentration in breastmilk of lactating mothers in Karo Regency. **Methods:** The population is 44 breastfeeding mothers with children aged 0–24 months. Data consist of chewing tobacco habit, food consumption and breastmilk iron level. **Results:** The results showed that more mothers (54.5%) chewed tobacco had lower iron levels breastmilk (<mean) than mothers who had iron levels breastmilk above mean levels (45.5%). There was significant relationship between chewing tobacco with iron concentration breastmilk. Conversely there is no significant relationship between consumption of energy, protein, and iron in lactating mothers with iron levels breastmilk. **Conclusion:** Intensive and continuous counseling needs to be carried out by community leaders through formal and informal forum to stop chewing tobacco in breastfeeding period.

919

Android and Web-Based Nutrition Education Program Improves Balanced Nutrition Behavior in Primary School Students

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Keywords: Android · Nutrition education · School children · Website

Background/Aims: The objectives of this study were to analyze the effect of android and web-based nutrition education program on nutrition behavior and their relationships with balanced nutrition in primary school students. **Methods:** The design of this study was quasi-experimental. A pre-post intervention study was conducted in Tuban City, East Java-Indonesia and involved 144 grades

5 primary school students. The intervention was conducted at school by applying nutrition education media such as poster, PowerPoint presentation, android, and website. The nutrition education media was made with interesting and informative contents which was supported by easy-to-understand materials, simple layouts, and attractive colors. A self-administered measurement with a validated questionnaire was applied to assess balanced nutrition behavior before and after the program. **Results:** The result showed that 72.9% school children had good knowledge, 78.5% had positive attitude, and 54.9% had good practices on balanced nutrition before intervention. After the education program, the good knowledge, the positive attitude, and the good practices on balanced nutrition increased by 11.8%, 5.5%, and 15.9%, respectively. The media of nutrition education based on android was better than the other media. **Conclusion:** The balanced nutrition behavior could be improved by nutrition education to guide the development of future nutrition education and prevention programs.

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The Relation between Income Level and Number of Family Members with Incidence of Malnutrition in Toddlers in Banjarmasin City

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Keywords: Malnutrition · Income level · Number of family members

Background/Aims: Malnutrition often occurs in infants and toddlers because they cannot find their own food while their nutritional requirements are high. Banjarmasin city always ranks the third highest in malnutrition problem in South Kalimantan Province. The number of malnutrition cases were 57 in 2014, 54 in 2015, 64 in 2016, and 37 with 2 deaths in 2017. The research aimed to analyze the correlation between income level and number of family members with the incidence of malnutrition among infants in Banjarmasin city. **Methods:** The research design was case-control approach. The sampling technique was total sampling with a ratio of case to control was 1:2. The number of sample was 31 cases and 62 matching controls based on region and age. Data were analyzed using a Chi-square test with a 95% confidence level. **Results:** The results showed that 56 respondents (60.2%) had a low income level and 37 respondents (39.8%) had a large number of family members. There was significant association between the incidence of malnutrition in infants and income level (p-value <0.001; OR = 18.7; 95% CI = 4.1–85.8) and the number of family members (p-value <0.001; OR = 9.8; 95% CI = 3.6–26.8). **Conclusion:** There was an association between income level and number of family members with the incidence of malnutrition in infants in Banjarmasin city.

921

Teachers' and Caterers' Perceptions, Challenges and Barriers of Implementation of School Meal Program in Sri Lanka

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Keywords: Challenges · Barriers · Perceptions · School meal programme

Background/Aims: Cash-based meal program and provision of liquid milk are the two types of school meal programs (SMP) conducted in Sri Lanka. The modalities of these programs have not been systematically monitored and evaluated. Aims of this study were to assess the perception of teachers and caterers regarding achieving the objectives, challenges and barriers in implementation of the SMPs. **Methods:** A qualitative study was conducted in eleven schools in different education areas in Sri Lanka. Focus group discussions and interviews with key informants were conducted. The conversations were transcribed verbatim including questions, answers and probes and the transcripts were analyzed. **Results:** The most significant challenges identified were financial constraints (delayed payments and substantially low prices per meal) faced by non-professional caterers and limited availability of caterers to provide services. Teachers perceived that improper practices in catering (not adhering to recommended menus, lack of variation in menus and provision of foods which were not preferred by the students) may have a negative influence on students' eating behaviors although SMP satisfied just the hunger. The teachers faced problems in providing the milk due to poor packaging of milk packets and low preference of the students to drink milk. Teachers strongly believed that support of the parents and strengthening the coordination between stakeholders were vital in successfully implementing the SMP. **Conclusion:** In conclusion, the identified challenges should be addressed in order to implement the SMPs successfully. The p programs should be strengthened through monitoring and proper coordination and better nutrition awareness of the stakeholders.

922

Communicating Nutrition Information through Food Labels in Malaysia: A Sharing of Experience

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Keywords: Food labels · Front-of-pack labelling · Nutrition label

Background/Aims: Food labels have been recognized by international agencies as effective channels of communicating nutrition information to consumers, to assist them in making food choices. Codex Alimentarius Commission of the FAO/WHO Food Standards Programme has published guidelines on nutrition labelling, nutrition and health claims, and are currently working on establishing guidelines on front-of-pack labelling (FOPL) systems to encourage governments to provide accurate and harmonized nutri-

tion information through food labels. Based on these international guidelines, the Ministry of Health (MOH) gazetted regulations on nutrition labelling and claims in 2003 to communicate nutrition information to consumers. Nutrition label provides information on the amount of energy and other nutrients in the product. Nutrition and health claims provide further information on the nutrients including the functions and their potential health benefits. As additional ways to communicate nutrition information through food labels, two FOPL systems, namely energy icon and Healthier Choices Logo (HCL) were also introduced in Malaysia in 2012 and 2017 respectively. These different approaches to communicate nutrition information through food labels have become important part of the strategy to assist consumers in adopting healthy dietary practices, as well as to encourage food industries to produce healthier food options. A variety of channels and platform have been adopted to promote the usage of nutrition information on food labels, especially by the Nutrition Division of MOH, the Nutrition Society of Malaysia and the food industry. **Conclusion:** All stakeholders should play active roles in encouraging consumers in the use of nutrition information on food labels.

923
The Effect of *Mocaf Koro Kurma* Biscuit on the Lipid and Anthropometry Profiles of Type 2 Diabetic Patients

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Keywords: Type 2 diabetes · Caromma biscuit · Temma biscuit · Anthropometry profile · Lipid profile

Background/Aims: Dyslipidemia in type 2 diabetic patients is characterized by increased triglycerides, decreased HDL level and increased LDL level. The previous study of the effect of *mocaf koro kurma (modified cassava flour, sword beans and date)* (Caromma) biscuit on blood glucose level (BGL) of diabetic patients showed the lowest increase of BGL (6.4 points). However, the effect of Caromma biscuit on lipid and anthropometry changes among type 2 diabetic patients has not been studied. The study aimed to assess the effect of Caromma biscuit consumption on the lipid and anthropometry profiles changes among type 2 diabetic patients. **Methods:** Pre-post-test randomized controlled trial (RCT) design was used to assess among 33 subjects in the intervention group (Caromma biscuit) and 31 subjects in the control group (*Tempe kurma/*Temma biscuit). Anthropometry data included were weight, height, body mass index (BMI), waist-hip circumference ratio (WHCR), body fat percentage (BFP), blood pressure, and fasting blood glucose (FBG). Lipid profile included were total cholesterol, LDL, HDL, and triglycerides collected before and after study. **Results:** Majority of subjects had over-nutrition, high BFP, risk of central obesity from WHCR, pre-hypertension, and high FBG. Lipid profile showed high cholesterol, LDL, triglycerides; and low HDL. There were an increase of weight, BMI, BFP, and WHCR in both groups. Blood pressure, FBG, cholesterol, LDL, HDL, and triglycerides decreased in both groups. **Conclusion:** Caromma and Temma biscuits can be consumed by diabetic patients to obtain positive blood lipid profile, but not for anthropometric profile.

924
Tempe, not Tofu, Intake Negatively Associated with HOMA-IR among Indonesian Women in West Java

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Keywords: HOMA-IR · Insulin resistance · Tempe · Tofu

Background/Aims: Prevalence of type 2 diabetes mellitus (T2DM) is increasing in Indonesia. Previous studies showed that total and animal protein intakes were positively associated with HOMA-IR in adults. No studies had been done to analyze the association between tempe and tofu intake, which are popular plant-based protein foods for Indonesians, with HOMA-IR. This study analyzed the association between tempe and tofu intake and HOMA-IR among adults. **Methods:** For this purpose, tempe and tofu intake data of 232 adult subjects of the Cohort Study on Risk Factors of Non Communicable Disease 2013–2015 were analyzed. While the HOMA-IR data was taken from the assessment in 2016. **Results:** The results showed that a combined tempe and tofu intake, and tofu intake alone was not significantly associated with HOMA-IR in both female and male subjects. Tempe intake was significantly and negatively associated with HOMA-IR. An analysis of the association regarding sex groups showed that the significant and negative association occurred only among female subjects. **Conclusion:** Tempe may have a protective factor for T2DM among females; and further clinical studies are required to understand the mechanisms.

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Adequate Protein Intake, But Not Type of Animal-Plant Protein, Is Inversely Associated with Obesity among Indonesian Adults in East Jakarta

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Keywords: Obesity · Protein intake · Plant-animal protein
Background/Aims: Obesity is becoming a serious challenge worldwide. Protein consumption is one of the important contributing factors to body fat regulation. But there is limited information on the relationship between specific type of protein and body fat regulation in developing countries. Therefore, we investigated the association between protein intake and its sources with obesity among Indonesian adults. **Methods:** This cross-sectional study involved 167 adults aged 19–50 years in urban East Jakarta selected through multistage random-sampling. Protein intake were collected from non-consecutive 2-day 24-hr recalls. Body fat percentage was measured by Air Displacement Plethysmograph (BOD POD) method and classified as obese (>33% for female and >25% for male). Multivariate logistic-regression was performed to identify the associations between protein intake and obesity. **Results:** About 69% of subjects were obese. The main sources of plant and animal protein intake came from cereals and its products (median = 11.3 gr/day or 22.9% of protein intake), and white meat (median = 7.85 gr/day or 15.9% of protein intake), respectively. After adjustment for marital status, sex and carbohydrate consumption, those who had adequate protein intake was inversely associated with being obese (Adjusted OR 0.415, p-value = 0.033). Nevertheless, type of animal or plant protein intake was not associated with obesity (Adjusted OR 0.879 animal protein, p-value = 0.69; OR 0.95 plant protein, p-value = 0.98). Adequacy of protein consumption is inversely associated with obesity. However, the type of protein consumption was not associated with obesity. **Conclusion:** Promotion of protein consumption and its sources was needed to successfully lower the prevalence of obesity in the country.

926

The Effect of Supplementary Feeding Program of Recovery for Nutritional Status of Malnourished Children Under Three Years in Kasemen Primary Health Care, Serang-Banten 2018

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Keywords: Nutritional status · Suplemental feeding · Malnutrition · Children under three years
Background/Aims: World Health Organization (WHO) estimates that 54% of child death is caused by malnutrition. The cases of malnutrition at Kasemen Primary Health Care tend to increase; 17.2% in 2016 and 20.2% in 2017 of the January-December 2017 period. This study aims to determine the effect of supplemental feeding (SF) with milk porridge come from industrial food on malnutrition children under three years. **Method:** Study was quasi-experimental without Control group. The respondents are malnorished children under three years (n = 34 childern). They were weighted before intervention which was taken as the pre intervention. Respondent was given milk porridge come from industrial food (50 gr) and provided 2 times (at 9–10 AM and 3–4 PM). The weights of the toddlers were recorded every week for 8 week period by *seca/dacin*(steelyard). The data analyzed with univariate and bivariate (dependent T-test). **Results:** After 8 weeks intervention the children with normal nutrition status 73.5% (25 children) and malnourished 26.5% (9 children). The nutrition status increased as significan (P < 0.05) after 8 weeks intervenstion (mean = 1.22 and Standard Deviation = 0.34). **Conclusion:** Providing supplementary food (SF) with milk porridge come from industrial food to malnutrition children under three years may improve the nutritional status. As a suggestion, *EKBang* (Economic Development division) may continue the program to provide supplemental feeding with the subsidy.

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The Effectiveness of Media to Reduce Tendency of Eating Disorders in Senior High School Students in Jakarta

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Keywords: Eating disorder · Media · Young adult
Background/Aims: The incidence and prevalence of eating disorders (ED) in teenagers have increased significantly in recent decades. That diet and appetite are closely linked to psychological health and emotional well-being is widely recognized. Psychological factors often influence eating habits. Many people overeat when they are bored, stressed, angry, depressed, or anxious. Women tend to be very concerned about body shape. According to their perception an ideal body shape that is both thin and slender body. This study aimed to look at the influence of media intervention in

nutrition education on the changes of eating disorders tendency among high school students in Jakarta. The media were poster+banners and leaflets+booklets. **Methods:** Quasi experimental design study was conducted in 7 selected schools in Jakarta for the duration of 7 months. **Results:** Test results showed there was the influence of media intervention on changes of ED score (p value = 0.007). The variables most influence the changes of ED score was ED score before the intervention (p value = 0000). The average change in ED score in leaflet+booklet group was 2.43 points, the posters+banner group was 1.61 points and the control group was 1.24 points. Overall, the booklet+leaflets media lowered the score symptoms of ED tendency more effectively by 41%. **Conclusion:** Leaflet and booklet educational materials used in this study could be applied to reduce ED symptoms.

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Towards an Evidence-Based Recommendation for a Balanced Breakfast: A Proposal from the International Breakfast Research Initiative

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Keywords: Breakfast · Nutrient recommendations · Dietary guidelines

Background/Aims: The regular consumption of breakfast has been associated with several health and nutritional benefits. However, there is no international nutritional recommendation specific for breakfast. The objective of the International Breakfast Research Initiative was to develop an approach to derive nutrient recommendations for a balanced breakfast accounting for the current nutritional profile of breakfasts. **Methods:** Nutrient intakes at breakfast and their contribution to daily intakes were analyzed in the Canadian, Danish, French, Spanish, UK and US national nutrition surveys. **Results:** In all countries, breakfast provided more carbohydrates, thiamin, riboflavin, folate, calcium, potassium, and magnesium, and less vitamin A, fats and sodium relative to its contribution to daily energy intakes (16–21%). Based on these results, guiding principles were developed to derive the nutrient recommendation. Breakfast consumers were stratified by tertiles of the Nutrient Rich Foods (NRF) diet quality index. The nutrient recommendations were derived taking into consideration the breakfast nutrient intakes associated with the top tertile of NRF, along with dietary guidelines from the Codex Alimentarius international food standards and the World Health Organization. The goal was to preserve the nutrient density of existing breakfasts, while addressing concerns regarding added sugars, saturated fats, dietary fiber, and vitamin D. **Conclusion:** This initiative is unique in seeking to derive nutrient recommendations for a specific meal using the observed nutritional profile of such meal. Applying this approach in Asian countries would support the development of recommendations of value to local public health nutrition policymakers and food manufacturers, and could help consumers to optimize food choices at breakfast.

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A Dietary Pattern Characterised by High Intakes of Free Sugar and Dietary Energy Density Is Associated with Poorer Life Satisfaction in Malaysian Adolescents

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Keywords: Dietary patterns · Life satisfaction · Adolescents · Malaysia

Background/Aims: A growing number of Western studies have suggested that dietary pattern of poor quality is associated with adverse mental health, however there is lack of such evidence among Malaysian children. Hence, we evaluated associations between an empirically derived 'energy dense, high sugar and fibre and low fat' dietary pattern (DP) and life satisfaction score in adolescents aged 13 years. **Methods:** Data was sourced from a total of 548 adolescents recruited from randomly selected public schools located in 3 southern states of Peninsular Malaysia. Information on dietary intake was obtained from a validated FFQ while life satisfaction was evaluated using an abridged 18-items version of Multidimensional Students' Life Satisfaction Scale (MSLSS). Z-scores for an 'energy dense, high sugar and fiber and low fat' DP were assessed by applying reduced rank regression analysis. Relationships between the DP and life satisfaction scores were assessed using regression models. **Results:** Mean (SD) of life satisfaction score was higher in girls [70.5(12.8)] compared to boys [67.6(15.4)], p < 0.05. The overall life satisfaction score was inversely associated with dietary pattern z-score in girls (β= −0.119; 95% CI: −0.125, −0.004) but not in boys (β = 0.134; 95% CI: −0.031, 0.266), after adjusting for potential covariates. In girls, scores for self (β= −0.13; 95% CI: −0.170, −0.015) and living environment (β= −0.12; 95% CI: −0.163, −0.007) domains were inversely associated with dietary pattern z-scores. **Conclusion:** This highlights the role of free sugar and dietary energy density, within the framework of whole diet, and target population at risk to improve life satisfaction among adolescents.

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Development of Intersectoral Collaboration Model for Nutrition Intervention in Post Disaster Rehabilitation Phase in East Lombok

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Keywords: Early child education · Optimized food-based recommendation · Post-disaster recovery · Psychosocial care · Under-five children

Background/Aims: In August 2018, a 7 Richter earthquake struck the island of Lombok, Indonesia. This study describes multisectoral collaboration model for post disaster nutrition recovery program developed for under-five children in East Lombok. **Methods:** We conducted literature review on post-disaster nutrition recovery program and basic nutrition profile of East Lombok to develop the program. Subsequently, a situational analysis was conducted to include local context. Lastly, the draft intervention model was discussed with local education and health officers for inputs and to encourage their ownership of the program and ensure sustainability of this model. **Results:** The draft of intervention model was as follow: Early Child Education centers (PAUD) are appointed as nutrition recovery centers. Mothers of the under-five children will attend weekly meetings at nearby PAUD where they will be taught by trained PAUD teachers to feed their children with the optimized food-based recommendations (including liver and fish floss as the local nutrient-dense foods) and to provide appropriate psychosocial stimulation for their children (which include language and science-based activities). Trained primary health care centers staffs will monitor the activities monthly and provide technical guidance when needed. Local education and health offices will evaluate the program after 6 months of intervention. A 6-month try-out in the affected area will be conducted to test its effectiveness. **Conclusion:** PAUD has potential to be a center for post-disaster nutrition recovery program for under-five children. Involvement of relevant stakeholders including PAUD teachers, public health centers and local authorities, as well as adjustment to local context and potentials are important part of this model.

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Standard Nutrition Guidelines – FBDGs in Malaysia

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Keywords: Nutrition Guidelines · FBDG · Malaysia

Background/Aims: WHO and FAO have always highlighted the importance of promoting optimal nutrition of the community as part of the strategy to reduce and control non-communicable diseases. Nutrition education is important to empower the community to make informed choices on their habitual dietary intake, which will influence their well-being. Food Based Dietary Guidelines (FBDG) is a standard guide and advise on food, food groups and dietary patterns to promote health and as a prevention to reduce the risk of non-communicable diseases. Technical Working Group (TWG) on Nutritional Guidelines responsible in developing the FBDGs is under the auspices of the National Coordinating Committee of Food and Nutrition (NCCFN) and is one of the six TWGs responsible in the implementation of National Plan of Action for Nutrition of Malaysia (NPANM) toward achieving the goals and objectives of the NPANM. Nutrition Division, Ministry of Health Malaysia act as the secretariat for NPANM. The TWG committee consists of various representatives from the academia, departments in the government sectors and professional bodies. Relevant stakeholders are co-opted as and when needed. Current evidence on nutrition sciences are used in the development of FBDGs. Once the draft guidelines and food guide have been prepared, they were pilot-tested among various stakeholders and consumer groups to ensure that they are practical and comprehensible while the messages are well-suited to the culture and norms of social setting with the local communities. **Conclusion:** This paper will attempt to present the past and current efforts of FBDGs development in Malaysia.

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Patterns of Fluid Intake among Young Adults in Baoding, Hebei Province, China

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Keywords: Fluid intake patterns · Young adults · China

Background/Aims: Water is important for the maintenance of physiological function. Study purpose was to investigate the patterns of fluid intake among young adults. **Methods:** A cross-sectional survey was conducted among 159 young adults randomly recruited in Baoding, China. Fluid intake was assessed by 7-day 24-h fluid intake record. The amount of fluid intake was recorded using a self-designed quantitative bottle. **Results:** A total of 156 young adults aged 18–23 years old (76 females, 80 males) completed this study. The median of total fluid intake daily was 1,135 mL. Significant difference was found between women and men (958 mL vs. 1,214 mL, P = 0.002). The amount of fluid intake at 8 occasions of a day was: 55 mL, 35 mL, 177 mL, 68 mL, 325 mL, 51 mL, 355 mL and 0 mL, respectively for before breakfast, during breakfast, after breakfast, during lunch, after lunch, during dinner, after dinner and midnight. The median frequency of total fluid intake daily was 6 times, which was significantly different between genders (7 vs. 6, P = 0.013). Comparing meal time, more subjects chose to drink between meals (166 mL vs. 889 mL). The maximum fluid consumption occurred after dinner, during which women's drinking amount was significantly less than that of men (289 mL vs 406 mL, P < 0.001). **Conclusion:** The fluid intake patterns were significantly different among young adults in Baoding with different genders.

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Breakfast Habits and Nutritional Status of School Children in Deli Serdang, North Sumatra, Indonesia

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Keywords: Anemia status, Breakfast habit, Glucose status, School children

Background/Aims: Breakfast are one of the important meal in the morning for school children. Adequate food intake and good nutritional status of school children support the learning process of students in school. The purpose of this study is to analyze breakfast habits and nutritional status of school children in Deli Serdang, North Sumatra, Indonesia. **Methods:** This study selected four elementary schools of medium to low socio economic primary schools in the study location. The subjects of this study were 200 fourth grade students from selected elementary schools. Primary data collected included characteristics, nutrition and healthy living knowledge and practices. Also data on body weight and height, hemoglobin and blood glucose levels. Data collection is done by recording, interviewing, measuring directly by field assistants, medical staff from local health center and researchers. **Results:** As many as 63.0% of students have breakfast usually, and 15.0% of students don't have breakfast or rarely have breakfast, and 21.5% of students sometimes have breakfast. The four reasons of students don't or rarely have breakfast are: not feeling hungry, uncomfortable stomach, unable to buy breakfast, and there is no time for breakfast at home. A total of 23.5% of students suffered from underweight, and 32% of students had anemia and 20% of school children had low glucose level. Knowledge and practice of nutrition and healthy living of students were low. **Conclusion:** About one third of student do not have breakfast every day, one third of students suffered from anemia, and one-fourth suffering from underweight. This implies an urgent need to improve breakfast habit and nutritional status of the school children.

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Dadih and Zinc Supplementation during Pregnancy Benefits Pregnancy Outcomes and Humoral Immune Response in West Sumatera, Indonesia

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Keywords: Dadih · Zinc supplementation · Pregnancy outcome · sIgA

Background/Aims: *Dadih* is a dairy product obtained from fermented buffalo milk in West Sumatra Indonesia. It contains various nutrients for human body, and source of probiotics that are beneficial for prenatal supplementation and pregnancy outcomes. **Methods:** We conducted randomized control trial in which 138 pregnant mothers at second trimester were randomly assigned to three groups 1). Control groups, 2). *Dadih* groups, and 3), *Dadih* and zinc groups. The mothers in *dadih* and zinc group received *dadih* tube (100 gram) six times a week and one packed of 20 mg zinc tablet weekly for six months of intervention. Mother's weight gain was measured every month. After six month of intervention, fecal secretary immunoglobulin A (sIgA) and anthropometric of newborn infants were measured in all groups. **Results:** The average maternal weight gain was 8.9 + 3.7 kg, the lowest was in the control group and the highest was in *dadih* and zinc groups (9.2 + 3.8 kg). We found significant difference on infant's birth weight compared to control, i.e. 163.9 (95% CI:-43.8 - 371.8) gram in *dadih* group and 236.5 (95% CI:-13.4–459.7) in *dadih* and zinc group after adjusted for ideal maternal weight gain (p < 0.05). There were no significant differences reduction of sIgA in mothers and in infants at the beginning and after six month of intervention among three groups (p > 0.05). **Conclusion:** *Dadih* and zinc supplementation were beneficial for improving maternal weight gain and pregnancy outcomes, but have no effect on immune response both for mothers and infants.

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The Association of Kangaroo Mother Care on Breastmilk Consumption of Low Birth Weight Baby

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Keywords: LBW · kangaroo mother care · breastmilk consumption

Background/Aims: Low birth weight (LBW) in Indonesia is still a public health problem. The National Health Survey (*Riskesdas*) in 2013 showed that the prevalence of LBW in 2011 was 11.1% and in 2013 was 10.2%. MOH had released guidelines for improving low birth weight babies' condition, and one of the method is Kangaroo Mother Care (KMC). KMC is a method that including direct contact of mother and baby, intermittent and also continuously that could provide basic needs of low birth weight baby with affection, warmth, comfort, and adequate nutrient. The aims of this study was to determine the association of KMC on breastmilk intake of low birth weight baby. **Methods:** The design was a prospective cohort with 40 subjects, consisting of KMC group (n = 20) Conventional Mother Care group (CMC, n = 20). Breastfeed milk consumption of low birth weight baby was evaluated from two aspects, based on mother's perspective and record of low birth weight breastfeeding frequency. The differences between variables were analyzed by Independent sample t-test and Mann-Whitney test. **Results:** Breastmilk consumption in KMC group was significantly higher than in CMC group (p < 0.05). **Conclusion:** KMC is very recommended for mothers with low birth weight babies to increase breastfeed milk consumption.

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Food Supplementation Intervention Program for Malnourished Under Five Years Old Children at Harapan Raya Puskesmas in Pekanbaru

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Keywords: Biscuits · Food supplementation · intervention · Under-nutrition

Background/Aims: One of the MOH programs in Indonesia to address under nutrition among children under five years is a food supplementation intervention. Biscuit is commonly given as supplementary food. The study objective was to analyze the effect of biscuits consumption on children nutritional status. **Methods:** The study was a quasi-experimental design using one group pre-test and post-test. Subjects involved were 36 children aged 1–4 years who received biscuits from the Harapan Raya primary health center in Pekanbaru. Child nutritional status was categorized based on weight for age z-scores (WAZ) into under-weight (WAZ <-2 SD) or normal weight (WAZ ≥-2 SD). The biscuits consumption was observed for one month. Indonesian recommended dietary allowance (RDA) was used to compare energy and protein intakes. **Results:** The proportion of underweight children at baseline were 55.6%. The mean of biscuit consumption was 10.1 ± 0.9 pieces. Energy and protein from biscuits were $39.3 \pm 4.4\%$ and $34.1 \pm 3.5\%$ of RDA, respectively which was above the nutrient supplementation standard. The proportion of underweight children who became normal was only 10.0% after one-month intervention. The changes of WAZ was significantly affected by WAZ at baseline. **Conclusion:** The biscuits as food supplementation might not been able to improve nutritional status of the children if was given for one month.

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Dietary Diversity Is Associated with Stunting among Children 6–23 months in Area of Mergangsan Public Health Center, Yogyakarta

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Keywords: Dietary diversity · Foods · tunting

Background/Aims: The period of pregnancy and the first two years of life was called the golden period, so the requirements for macro and micronutrients must be fulfilled. Stunting is a chronic undernutrition condition as a result of inadequate quality and quantity of complementary foods with or without infectious diseases. Quality and quantity of complementary foods can affect linear growth. The study aimed to analyze the association between dietary diversity and stunting among children aged 6–23 months in the area of Mergangsan public health center, Yogyakarta. **Methods:** Study was an analytic observational study with a cross-sectional design. The population was children aged 6–23 months from 60 integrated health post (*Posyandu*) in the area of Mergangsan pimary health center with a total population of 343 children. The sample size was 135 children. Samples were selected using simple random sampling. Data were analyzed using univariable (descriptive), bivariable (chi-square test), and multivariable analysis (multiple logistic regression). **Results:** There was a significant association between dietary diversity of complementary foods (p = 0.012; RP = 2.87; CI: 1.23–6.68) and father's height (p = 0.03; RP = 2.58; CI: 1.06–6.30) with stunting. The multivariable analysis showed that there was a significant association between dietary diversity of complementary foods and stunting while there was no association between the father's height and stunting. **Conclusion:** Poor dietary diversity of complementary foods was a risk factor of stunting among children aged 6–23 months.

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Development of a Healthy Eating Index (HEI) for Adults in Sri Lanka

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Keywords: Dietary guidelines · Diet quality · Food servings · Healthy eating index · Sri Lanka

Background/Aims: Diet is a determinant of health and nutrition. Healthy eating index (HEI) is a tool developed to measure diet quality in accordance to dietary guidelines. In the absence of proper dietary quality assessment tools, present study was conducted to develop a HEI for Sri Lankans as a novel tool to assess the diet quality. **Methods:** Dietary intake data were collected using an interviewer administered food frequency questionnaire from 200 adults in Ragama and Pannala areas. Energy and nutrient intake was calculated using the Foodbase 2000 software consisted of Sri Lankan food composition data. Number of servings of each food group was used in deriving the HEI. Each food group was assigned a score thus used in HEI development. HEI composed of 10 components namely cereals and equivalents, vegetables, fruits, milk and dairy, animal foods and pulses, nuts, sodium, energy from saturated fats, energy from added sugar, dietary fiber. All components were equally weighed and possible maximum score was 100. **Results:** The mean HEI score was 60.5. Majority of participants (86.9%) were in need of improvement category (51–80 scores) while 13.1% were in poor diet quality category (<51 scores). Component scores were less than five for sodium, nuts and energy from saturated fat components. The HEI showed high content validity against national dietary guidelines. **Conclusion:** New HEI was found to be a simple, valid indicator for measuring diet quality of adults.

Poster Presentation

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Relationship of Dairy Intake and Grip Strength for Elderly – Residents Live in Taichung as Example

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Keywords: Dairy · Grip strength · SPPB · Elderly

Background/Aims: The muscle strength was getting lower with the increasing age for elderly. This study was to investigate the dietary habit of dairy product and the physical performance of elderly. **Methods:** Healthy elderly lived in the Taichung coast area were recruited to proceed the measurement of grip strength and short physical performance battery (SPPB) score. The frequency questionnaire for dairy intake was collected. **Results:** There was a positive correlation between daily milk intake and hand grip strength, muscular endurance, balance ability, SPPB performance for female subjects. There was highly positive correlation among grip strength, physical fitness and performance. **Conclusion:** It was concluded that the nutritive role of dairy may support the maintenance of muscle and keep the physical fitness for regular living activity. Grip strength may be used as an easy conducted index for elderly physical performance.

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The Relationship of Food Consumption Index with Anemia Status on Adolescent Girls

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Keywords: Adolescent girl · Anemia · Food consumption

Background/Aims: Lack of nutrients is the main cause of anemia that occurred in 2.5–5 billion children and adulthood globally. Especially in young women, anemia caused by iron deficiency becomes a significant public health problem. This study aimed to assess the food consumption index and sociodemographic factors associated with anemia in young women. **Methods:** Dietary assessment data was classified into 5 food groups to obtain food consumption index. The food group was valued by the grade of nutrients based on their relationship to anemia. **Results:** There was a relationship between Food Consumption Index with anemia status (p value = 0.009). Adolescent girls aged 14–18 years who were anemic was 19.1% (12.4% had mild anemia and 6.7% had moderate anemia). No relationship between sociodemographic factors with anemia status. **Conclusion:** The food consumption index was beneficial to understand dietary data; but further researches are needed for validation.

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Assessment of Knowledge, Attitude, and Practice of Hygiene and Sanitation among Food Handlers in A Psychiatric Hospital

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Keywords: Food handler · Hygiene and sanitation · Knowledge · Attitude and practice · Psychiatric hospital

Background/Aims: In a psychiatric hospital that also provides nutritional service, food hygiene and sanitation are considered as factors to prevent nosocomial infection transmission. Due to the wide area of the hospital and considerable number of patients as a referral psychiatric hospital in Central Java region, the supervision of hygiene and sanitation might be challenging in RSJ Prof. Dr. Soerojo Magelang. The study aimed to measure the levels of knowledge, attitude, and practices of food handlers regarding hygiene and sanitation, and to assess the relation among these factors. **Methods:** This research utilized mixed methods. Quantitative data were measured among 37 food handlers using self-reported questionnaire and observational checklist, then analyzed using Rank Spearman correlation test. Qualitative data were collected through in-depth interview using triangulation method. **Results:** As much as 89.2% and 83.8% of the subjects possessed good knowledge and attitude regarding hygiene and sanitation, respectively. However, there were more subjects with poor hygiene and sanitation practice (37.8%) compared to those who did good practice (35.1%). There was no significant relation among knowledge, attitude, and practice, regardless of any combination between two factors (p > 0.05). Past training in food safety was found to be affecting hygiene and sanitation practice (p = 0.024, p < 0.05). Most of the subjects have never received hygiene and sanitation-related training and there were differences in the application of standard operational procedures. **Conclusion:** Food handlers' knowledge and attitude in hygiene and sanitation were considerably good. Yet, it is necessary to improve the practice of hygiene and sanitation through training.

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Teachers and Health Staffs Experience in Delivering Weekly Iron-Folic Acid (WIFA) Supplementation at School in East Java and East Nusa Tenggara, Indonesia

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Keywords: Adolescent girls · Anemia · Iron and folic acid · Program evaluation

Background/Aims: Indonesia Ministry of Health has targeted an increased supply of WIFA Supplementation program to school going adolescent girls gradually from 10% in 2015 to 30% in 2019. This study aimed to evaluate the delivery of WIFA Supplementation at Primary Health Center (*Puskesmas*) and school level in 20 districts. **Methods:** Focused group discussions (FGDs) with teachers (n = 66) and public health center staffs (n = 83) and in-depth interviews (IDIs) with teachers (n = 11) and public health center staffs (n = 11) from 60 schools and 20 public health centers in 2 provinces were conducted. The study was conducted in 10 districts, each from East Java and East Nusa Tenggara provinces. The teachers and health staffs were chosen purposively to explore the implementation of WIFA delivery. All FGDs and IDIs were audio-recorded, transcribed verbatim, and analyzed for key themes relating to awareness using NVivo Pro 12. **Results:** The experience of health staffs and teachers involved in delivering IFA described the lack of a guidebook for delivering WIFAS in these districts. The lack of access to a guide for implementation was associated with not only limited knowledge and about anemia and WIFAS, but also lack of awareness of how to plan, monitor, and report the WIFAS intervention. **Conclusion:** Capacity building and awareness of detailed IFA delivery management is needed for both Primary Health Center staffs and teachers, with an expressed need for a guidebook.

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Microplastic Intake via Shellfish Consumption and Its Potential Risks to Human Health

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Keywords: Microplastic intake · Shellfish · Dietary study

Background/Aims: Microplastic contamination in marine environment and seafood has raised global concern on the human health impact. The possibility of microplastic ingested by human is very likely to occur via consumption of seafood that is eaten whole, such as shellfish. However, the risks of microplastic on human health are still under investigation. The aims of this study was to assess shellfish consumption of Semarang inhabitants and to determine their microplastic intake via shellfish consumption. **Methods:** Multistage random sampling method was used to determine the respondents from districts until neighborhood level. In total there were 500 respondents invited to participate in this study. The respondents were classified based on four age groups, i.e. children (0–9 years), adolescent (10–19 years), adults (20–59 years), and elderly people (60->75 years). The daily intake of shellfish of Semarang inhabitants was obtained from FFQ and recall diet. The concentrations of microplastics were obtained from a microscopic technique following a series of alkaline digestion and filtration. To estimate the microplastic intake, the daily intake of shellfish was multiplied by the average concentration of microplastics found in shellfish collected from Semarang.

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Determinants of Healthy Breakfast Quality in Elementary School Children in Rural and Urban Areas of Timor Island, East Nusa Tenggara Province

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Keywords: Healthy breakfast · Elementary school children (SD) · Income level · Eating habits · Education level

Background/Aims: Breakfast is a source of energy for school children for activities and learning at school. **Methods:** This study used the cross sectional study design with the aim to determine the factors associated with the formation of the quality of healthy breakfast of elementary school children in rural and urban areas of Timor Island, East Nusa Tenggara Province. The total number of samples was 700 students who were in grade 5 (five) elementary schools where each region (rural and urban) was 350 elementary school students. Data were analyzed in univariate, bivariate and multivariate. **Results:** About 16% of school children in the Kupang City Region and 24% of school children in Malaka District had unhealthy breakfast habits or no breakfast at all. More than 60% of school children in both areas have poor breakfast quality. Factors associated with healthy breakfast quality were education of parents (p < 0.05; OR = 3.45), type of work that takes longer duration outside the home (p < 0.05; OR = 1.05), level of family income (p < 0,05; OR = 3.40), and eating habits (p < 0.05; OR = 2.01). **Conclusion:** Factors associated with the quality of healthy breakfasts in rural and urban areas were education, type of work and income of parents and eating habits.

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School Canteen and School Garden: Potential Learning Venues for Building a Healthier School Food Environment

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Keywords: School canteen · School garden · School food environment · Healthier food choices

Background/Aims: The school has been receiving much attention for cultivating good nutritional practices that prepare students to enter adulthood. Nevertheless, we lack to understand the roles of the school canteen and school garden in providing a healthier school food environment. This paper aims to share the process of the development of two guidebooks for engaging students with experiential learning on food and nutrition-related topics through school canteen and school garden. **Methods:** Each book was developed through a workshop that involved teachers from different school levels, as well as other parties involved in canteen management and its surveillance. Each contributor wrote a section based on his/her experience. At least one reviewer from another organization having experiences with some school-based innovations was invited to provide comments and suggestion on the books. **Results:** The final guidebook on school canteen documented 11 best practices shared by 12 contributors from primary, junior high, and vocational schools, canteen management of a private school, and public health centers. These best practices addressed lessons learned on school policies, canteen management, nutrition education, surveillance and control system, and partnership. The final guidebook on school garden presented 30 ideas for teaching nutrition in the primary, junior high, and senior high school levels. All lesson plans were written by 12 teachers using school garden as media for nutrition education. **Conclusion:** Further follow-up is needed to see the influence of the books in shaping students' preference for healthier food choices at school and finally on their healthier nutritional practices.

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Salt Consumption, Health and Nutritional Status of Research Extension Professional Staff Aged 20–30 Years in the University of the Philippines Los Baños

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Keywords: Salt consumption · Health · Nutritional status

Background/Aims: Excessive consumption of sodium followed by overweight and obesity, high blood glucose levels and high levels of fat in the blood are said to be linked with raised blood pressure and adverse cardiovascular health. The study was conducted to evaluate salt consumption, health and nutritional status of research-extension professional staff (REPS) aged 20–30 years old in the University of the Philippines Los Baños, Laguna. **Methods:** The Food Nutrition Research Institute-Unilever salt calcula-

tor was used to measure salt intake; SF-12 and blood pressure were used to determine health status; BMI and waist circumference were used to determine nutritional status. A total of 81 REPS participated in the study. **Results:** Results showed that 85% of the participants had normal salt intake and 71% incurred an average health score. However, 33% of the participants were assessed to be obese 1 and 39% were evaluated to have health risk associated with excess fat around the waist. No significant correlation between salt consumption, health score and nutrition status was seen. **Conclusion:** It is recommended that an individualized and comprehensive dietary intake and physical activity be gathered to provide further insight into the relation of salt intake, obesity, and health status.

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Optimizing Complementary Feeding Model with and without Micronutrient Home Fortification Using Linear Programming Approach

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Keywords: Complementary feeding · Linear programming · Micronutrients powder

Background/Aims: The low quality and quantity of complementary feeding (CF) contributes directly to the high incidence of malnutrition in under five children in Indonesia. Alternatives to improve CF include locally available nutrient-dense foods and home fortification with micronutrient powder (MNP). This study aims to develop optimized complementary feeding recommendations (CFR) using local food that is affordable, available and in accordance with culture using linear programming (LP) approach with and without MNP. **Methods:** Cross sectional study was conducted on 304 children aged 6–23 months in Susut District, Bangli Regency, Bali Province. Data collected included social demographic characteristics, breastfeeding, anthropometric, and dietary data. Nutrient composition in micronutrient powder (*Taburia*) was also included in LP analysis using Optifood software. **Results:** Most children had normal nutritional status and 86.2% of them were still breastfed. The median dietary diversity score was 3 and most children had low energy intake and low nutrient density. LP analysis indicated that problem nutrients in the 6–11 month age group were calcium, niacin and zinc, while in the 12–23 month age group was calcium. Both CFRs with and without MNP can meet nutrient adequacy (≥65% RNI in minimized case) for all nutrients. MNP of once weekly is sufficient instead of 3 times weekly as currently recommended in the program. **Conclusion:** It is necessary to evaluate the effectiveness of optimized CFRs with and without MNP as well as MNP-alone in improving nutrient intakes, nutritional status and gut microbiota.

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Obesity associated Vitamin D Insufficiency among Women

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Keywords: Women · Obesity · Vitamin D · Insufficiency

Background/Aims: Vitamin D insufficiency is highly prevalent in women. Vitamin D bioavailability could be reduced in obesity due to increased sequestration by white adipose tissue. The study aimed to assess the obesity status among women, determine their lifestyle and physical activity pattern study their dietary intake, estimate the vitamin D and lipid profile of selected women and associate the relationship between Vitamin D and obesity. **Methods:** A total of 100 working women working in IT sector, hotels and educational institutions were selected for the study. Anthropometric measurements and dietary recall were conducted. Fasting blood glucose level, serum Vitamin D and lipid profile were measured for 15 obese and 15 non-obese women. **Results:** Fifty-six percent (25–39 years) and 44 percent (40–45 years) of the women were obese. Waist and hip circumference of women in the age group between 40–45 years were 89.7 and 107.4 cm and in the age group between 25–39 years it was 88.6 and 102.8 cm respectively. In the age group of 40–45 years in obese women, serum Vitamin D was inversely proportional to waist hip ratio and LDL cholesterol. An inverse relationship between body fat percentage and total cholesterol with serum vitamin D was observed among women in 25–39 years. Findings from the study revealed that, obese women with a higher consumption of fat and less intake of calcium rich foods had low serum Vitamin D levels than the non-obese women. **Conclusion:** There was an association between Vitamin D status and obesity among women.

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Bone Mineral Density in Pre-Pubertal Malaysian Children with Habitual Low Calcium Intake

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Keywords: Bone · Mineral density · Pre-pubertal children · Calcium intake

Background/Aims: Bone health status in Asian children with low habitual calcium intakes is under-reported. **Methods:** We measured the baseline total bone mineral density (TBBMD) using dual-energy X-ray absorptiometry (DXA), calcium intake using semi-quantitative food frequency questionnaire (FFQ) and physical activity using Children Physical Activity Questionnaire (C-PAQ) in 243 pre-pubertal Malaysian children aged 9–11 years old (Tanner Stage 1 & 2) participating in the effects of prebiotic fiber on bone health (PREBONE-Kids) study. Maternal lumbar spine bone mineral density (LSBMD) was also measured. **Results:** Median (IQR) calcium intake was 266 mg (180; 440) and this met only 27% of recommended intake. Boys had higher TBBMD than girls (0.780 ± 0.075 g/cm^2 vs. 0.754 ± 0.072 g/cm^2 respectively, p < 0001). Based on Asian reference population, 61.7% of the children had TBBMD Z-scores within 1 SD, 36.6% above 1 SD, 1.9% were at risk for low BMD for chronologic age (–1.9 to –1.0 SD) and none had low bone mass (<–2.0 SD). TBBMD was significantly correlated with weight (r = 0.736, p < 0.000), height (r = 0.620, p < 0.001), physical activity level (r = 0.252, p = 0.008) but not with calcium intake. Multiple linear regression analysis, after correcting for multicollinearity, showed body weight best explained TBBMD (r2 = 0.536, p < 0.001) followed by maternal LSBMD (incremental r2 = 0.024, p = 0.008). **Conclusion:** We conclude that body weight is a significant predictor of BMD attainment during growth among pre-pubertal Malaysian children with low calcium intakes.

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Consumption of Ultra-Processed Foods among Japanese Middle and Elderly Adults and the Associations with BMI

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Keywords: NOVA system · Ultra-processed foods · BMI · Japanese

Background/Aims: In Japan, the consumption of ultra-processed foods (UPF) has shown an upward trend in recent years. Previous studies in western countries have shown that increased consumption of UPF was linked to obesity. We aim to evaluate the association between consumption of UPF and BMI among Japanese adults. **Methods:** Data from two community-based cross-sectional studies (Saitama study, subjects aged 30–59 years; Manazuru study, subjects aged 40–74 years) were used for analyses. Dietary intake was assessed using dietary records. Foods were classified based on the NOVA system (Monteiro 2018). We divided the subjects into three groups for each dataset, according to the tertile of UPF energy proportion (% of total energy). Total number of subjects was 418 men and women. ANCOVA and logistic regression analysis adjusted for age, marital status, income, exercise habits, smoking status, and total energy were used for analyzing the association between UPF and BMI. **Results:** Mean ± SD UPF energy proportions were 41.0 ± 20.5% in Saitama and 30.1 ± 15.7% in Manazuru. As the UPF energy proportion increased, the percentage of obese (BMI ≧25) subjects also increased in both studies. Compared to the low-UPF group, odds ratios for being obese were higher (OR [95% CI] 2.87[1.00–8.18] in Saitama, 24.71[1.51–403.55] in Manazuru) in the middle-UPF group men. In women, odds ratio was significantly higher (5.89[1.17–29.64]) in Saitama, 3.55[1.06–12.00] in Manazuru) in the high-UPF group women. **Conclusion:** Higher energy proportions of UPF were associated with higher risk of being obese among Japanese adults.

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Global Fortification Data Exchange: Actionable Food Fortification Data All in One Place

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Keywords: Food fortification · Fortification data · Data visualizations

Background/Aims: The Global Fortification Data Exchange (GFDx) was designed to facilitate governments, donors, implementing agencies, and other members of the global health and development community to reach populations affected by vitamin and mineral deficiencies with data-driven fortification policy and programs. It aggregates global and national data for seven key fortification indicators and visualizes this data to inform the planning, resourcing, implementation, and evaluation of food fortification programs. It enables decision makers to answer critical questions such as: (i) How many and which countries require the mandatory fortification of maize flour, oil, rice, salt, or wheat flour? (ii) In countries with legislation standards, what nutrients are required to be included in fortified foods? (iii) How much maize flour, oil, rice, salt or wheat flour is available or consumed in a given country? (iv) What proportion of maize flour, oil, rice, salt, or wheat flour is industrially processed and hence able to be fortified? (v) How much of the food consumed in a given country is fortified at levels that meet the country's standards? (vi) What proportion of a country's population is consuming fortified maize flour, oil, rice, salt, or wheat flour? The aim of the GFDx is to enable nations to benefit fully from the proven intervention

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Nutrition Education Improves Nutritional Knowledge and Attitude of School Children at Iodine Endemic Area in West Java, Indonesia

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Keywords: Iodine · Nutrition promotion · Nutritional practice · School children

Background/Aims: Iodine deficiency disorder (IDD) is not a major health problem anymore in Indonesia. As Universal Salt Iodization has been implemented, the median urine iodine excretion among school children is more than adequate. However, it has not been established whether the knowledge, attitude and practice (KAP) of school children regarding IDD are good. This study aimed to analyze the effects of nutrition education on nutritional KAP of school children at iodine endemic area in West Java, Indonesia. **Methods:** A pre-post-test experimental study with control was conducted in Bogor District in 2016. This study involved 181 children, divided into two groups, 94 subjects in intervention group receiving nutrition education every two weeks, each covering one topic related to nutrition and iodine, namely 1) Macronutrients, 2) Micronutrients, 3) Balanced Nutrition, and 4) Iodine and Iodized Salt, and 87 subjects in control group. Dependent and independent t-test was used to analyze the effect of intervention. **Results:** In both groups (control vs. intervention), the majority of children had poor nutritional knowledge (score <60), either at baseline (43.0 vs. 42.3) or endline (45.8 vs. 51.3). There was a significant difference in the increase of nutritional knowledge score (p < 0.01) and nutritional attitude score (p < 0.05). However, no significant difference (p > 0.05) shown in the increase of nutritional practice scores. **Conclusion:** Nutrition education improved nutritional knowledge and attitude. Nevertheless, with still poor knowledge at endline, longer and more frequent nutrition education needs to be conducted to improve nutritional practice.

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Body Mass Index and Body Composition of Indonesian Mall Visitors in Several Cities

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Keywords: Body composition · Body fat · Body mass index · Body muscle

Background/Aims: Indonesia is facing a double burden of malnutrition, including overweight problem. This study aimed at comparing body mass index and body composition of Indonesian mall visitors in 17 cities of Indonesia. **Methods:** This study was done in 30 malls in 17 cities of Indonesia from February-March 2018, using a cross sectional study design with the total subject was 732 males and females aged 13–85 years old. Information on the characteristics of subjects were obtained through an interview. Karada Scan HBF-375 Omron was used to measure body weight and body composition; and *microtoise* was used to measure body height. **Results:** The mean BMI was 23.4 ± 4.0 kg/m^2. As much as 9.6% of subject were overweight ($25 \leq$ BMI <27 kg/m^2), and 19.8% were obese (BMI ≥ 27 kg/m^2). The five highest prevalence of overweight were in the cities of Kendal (11.8%), Bekasi (11.7%), East Jakarta (11.6%), North Jakarta (11.1%), and Purwokerto (11.1%). The mean percentage of body fat and body muscle was 27.8 ± 7.3 kg, and 27.0 ± 4.7 kg respectively. The five highest prevalence of excess body fat were in the cities of Semarang (73.7%), Solo (67.6%), Purwokerto (66.7%), Probolinggo (56.3%), and Bekasi (55.3%). The five highest prevalence of normal body muscle were in the cities of North Jakarta, Kendal, South Tangerang, South Jakarta, and Bandung. **Conclusion:** Although the prevalence of overweight among mall visitors is relatively lower compared to the national data, the prevalence of excess body fat was higher than the prevalence of overweight. This implies the importance of programs on healthy diet and physical activity

Whole Grain Intake and Its Association with Dietary Fatty Acids Intake among Multiethnic Malaysian Schoolchildren

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Keywords: Whole grains · Monounsaturated fatty acids · Polyunsaturated fatty acids · School children

Background/Aims: Whole grains are associated with several health benefits. Little is known however, about the associations of whole grains intake with dietary fatty acids. This study aimed to assess the whole grains intakes and its association with dietary fatty acids among the multi-ethnic schoolchildren in Kuala Lumpur, Malaysia. **Methods:** This cross-sectional study was conducted among 392 schoolchildren aged 9–11 years, cluster sampled from five randomly selected schools. Whole grain and nutrient intakes were assessed by 3-day 24-hour diet recalls. The whole grains content of food was estimated mainly through the use of quantitative ingredient declarations on food labels. **Results:** A total of 55.6% (n = 218) were whole grains consumers. Mean daily intakes of whole grains in the total sample was 5.13 g/d (SD 9.75 g/d). In the whole grains consumers' only sample, mean intakes reached 9.23 g/d (SD 11.55 g/d). Significant inverse associations were found between whole grains intake and monounsaturated fatty acid (MUFA) (r = –0.157; p = 0.021) and polyunsaturated fatty acid (PUFA) (r = –0.187; p = 0.006) intakes. Further, whole grains intake was a significant predictor of MUFA (β = –0.152; p = 0.003) and PUFA (β = –0.189; p < 0.001) intakes, after controlling for sex, age and races. **Conclusion:** Whole grains intake was well below recommendations. Schoolchildren who consumed higher whole grains tend to reduce fat intake; however, it would reduce the MUFA and PUFA intakes. Efforts are needed to understand the types of wholegrain foods consumed among Malaysian multi-ethnic schoolchildren, to design effective health promotion initiatives to promote whole grain consumption, yet will not reduce MUFA and PUFA intakes.

The Nutrient Quality of Recipes Recommended for the School-Based Feeding Program based on the Healthy Recipe Framework Criteria

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Keywords: Healthy recipe · Framework criteria · School-based feeding program

Background/Aims: The School-Based Feeding Program (SBFP) is the Philippines' action to address wasting among school children. The Healthy Recipe Framework (HRF) Criteria was developed to assess meals and recipes based on the recommendations of the Joint FAO/WHO/UNU Expert Consultation on Diet, Nutrition and Prevention of Chronic Diseases. **Methods:** This study assessed the nutrient quality of 71 recipes (37 protein dishes; 27 snacks; 7 beverages) recommended to be used in SBFP using the HRF Criteria. Each recipe was subjected to nutrient evaluation using food composition database to identify which one passed the food-based (FB) criteria (with recommended ingredients) and the food and nutrient-based (FNB) criteria (with recommended ingredients and amount of sodium, saturated fatty acids [SFA], added sugar and energy [kcal/serving]). **Results:** While 90% of recipes passed the FB criteria, only 18 passed the FNB criteria (24%); 6 containing <30% of recommended ingredients (whole, vegetables, fruit, among others) per serving failed the FB criteria (8%). All snack and beverage recipes (46%) failed the FNB criteria because their energy content per serving was >110 Kcal and the sugar content per 100 gram of the beverage was >5 grams, respectively, Moreover, 30 recipes had more calorie per serving (42%); 17 had more SFA (21%); and 11 had higher sodium content (15%) than the recommended. **Conclusion:** Majority of the recipes passed the food-based criteria but three-quarter failed the FNB criteria. The HRF criteria could be used in the recipe development to help improve the school-children's nutritional status.

Dietary Quality of Pregnant and Child Bearing-Age Women and Its Relation to Nutritional Status: East Jakarta Cohort Study

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Keywords: Dietary Quality Index-P (DQI-P) · East Jakarta Cohort Study · Women

Background/Aims: Many studies indicated that urban women are at risk of malnutrition. However, studies on dietary quality during pregnancy and years after and their impact to the nutritional status are limited. Therefore, we assessed the dietary quality during pregnancy, three years after pregnancy and determined its relation to mid-upper arm circumference (MUAC). **Methods:** An East Jakarta cohort prospective study was initiated in 2015 and followed-up until 2018. MUAC was assessed by standardized measuring tape. The food consumption was taken from 2-day 24-hr recalls. Dietary Quality Index-Pregnancy (DQI-P) scores with 8 components were calculated from Pregnancy, Infection and Nutrition study in USA. The difference between DQI-P in two periods was assessed by the Wilcoxon-signed rank-test. Indonesian, Thai, and American food database were taken to calculate the dietary scores. Multivariate linear-regression was performed to determine the association between DQI-P score and MUAC combining two periods. A total of 116 women was followed up. **Results:** The median of DQI-P score during gestation in 2015 was significantly higher than non-pregnancy period in 2018 [35 (27.5; 41.5) versus

25 (17.0; 30.0); p-value <0.001, respectively]. Carbohydrate, fat, calcium, iron and folate intake were significantly different between two periods (p-value <0.001). The DQI-P was positively associated with MUAC of women (n = 232) after adjusting for the pregnancy status (adjusted β = 0.017, p-value <0.05). **Conclusion:** Dietary quality during pregnancy was different from non-pregnancy period, but overall intake remained poor. Women's dietary quality were associated with MUAC. It is important to improve diet quality to reduce malnutrition risk.

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Analysis of the Pregnant Women Thyroid Function and Urinary Iodine Level in China

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Keywords: Urinary iodine · Pregnant women · Thyroid
Background/Aims: The study aimed to evaluate the iodine nutrition status by thyroid function and urinary iodine level for pregnant women participated in the 2015 Chinese Adult Chronic Disease and Nutritional Surveillance (CACDNS). **Methods:** Urinary iodine concentration (UIC) was measured by using a catalytic spectrophotometric method of arsenic and cerium. Plasma levels of TSH, FT3, and FT4 TPO-Ab, TG-Ab were determined by using an automated chemiluminescence immunoassay analyzer. **Results:** A total of 6173 urinary samples collected from pregnant women residing in different regions of China were analyzed for UIC, which median urinary iodine concentration (MUIC) was 146 μg/L. After exclusive the positive thyroid peroxidase antibody (TPO-Ab) and thyroglobulin antibody (TG-Ab) (about 10%), a total of 2097 plasma samples collected from pregnant women at three trimesters of China were analyzed for levels of TSH, FT3, and FT4, then judged the prevalence for different types of abnormal thyroid function and normal prevalence. The rate of normal thyroid function for this study was more than 85%, and in 2010–2012 CNNHS an increase of 7.4 percentage point. The most common type of abnormal thyroid function was similar with 2010–2012 CNNHS, and the prevalence of which was decreased to 6.8%. Compared with the subgroup with MUIC less than 250 μg/L, the prevalence of subclinical hypothyroidism significantly increased among women with MUIC more than 250 μg/L. **Conclusion:** The iodine status of Chinese pregnant women in 2015 CACDNS is generally adequate, yet we should continue to strengthen monitoring the iodine nutritional status and thyroid function in this population.

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Determination of Umami Taste Perception among Primary School-Aged Children in Malaysia

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Keywords: Taste perception · Umami · Glutamate · Palatability
Background/Aims: Sensory attributes of food are important determinants of palatability and food intake. Previous studies have highlighted the relationship between taste perception, such as sweetness, with obesity. However, studies on umami taste, as one of the five basic tastes that provides savory and meaty flavor sensation, are generally scarce among Southeast Asian population, and specifically in Malaysian children. This study aimed to investigate umami taste perception among primary school-aged children in Malaysia. **Methods:** A total of 169 participants aged 9–11 years of both sexes and from the three main ethnicities, namely Malays, Chinese and Indians, were recruited. Measurements of body weight, height, waist circumference, body fat percentage and blood pressure were carried out. Monosodium glutamate (MSG) concentrations ranging from 0.056 mM to 1 M were used to assess umami detection threshold by using two-alternative, forced-choice staircase procedure. **Results:** Mean umami detection threshold of children was 1.21 ± 1.03 mM. Boys had significantly (p < 0.05) higher threshold (1.49 ± 1.39 mM) compared to girls (1.06 ± 0.74 mM). There were no significant differences in umami detection threshold among the three ethnicities (p = 0.832). Overweight/obese (OW/OB) children had a slightly lower threshold (1.11 ± 0.71 mM) compared with non- overweight/obese (non-OW/OB) children (1.23 ± 1.01 mM) although no significant difference was found (p = 0.54). **Conclusion:** Our findings showed girls have better taste sensitivity of umami compared to boys. Future studies should be conducted to better understand the association between taste perception of umami and total dietary intake.

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Information-Seeking Behavior and Family Support Characterize Mothers' Consistent Compliance towards Four National Maternal and Child Nutrition Programs

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Keywords: Maternal and child national nutrition program · Adherence · Seeking information · Husband support

Background/Aims: Despite the importance of the first 1,000 days of life, there is high proportion of pregnant women and young children in Indonesia who missed the opportunity to acquire better nutrition during this period by having low compliance towards the existing national maternal and child nutrition (MCN) programs. The study aims to explore factors supporting mothers for having consistent good compliance towards the four MCN program during the first 1,000 days, i.e. maternal iron-folic acid supplementation (IFAS), continued breastfeeding (BF), complementary feeding practices (CF), and vitamin A capsule supplementation (VAS). **Methods:** In-depth interviews were employed to 48 mothers of children aged 6–23 months in West Java (urban and rural). **Results:** Among the informants, 23 complied towards IFAS, 39 towards BF, 15 towards CF, and 40 towards VAS. Regardless their variation on educational level, type of family, maternal employment, socio-economic condition, and birth order, nine mothers managed to have consistent good compliance towards the four programs. They were characterized by their good health-seeking behavior, active information-seeking on pregnancy and child care, and possession of active and continuous support from the husband. The information helped mothers managing the challenges particularly breastfeeding for working mothers, dealing with difficult-to-eat child, and preparing variety foods with simple preparation. The husband reminded mothers to take the IFA tablets, looked for information, and fed the child. **Conclusion:** The findings highlighted the need to bring such maternal and child care information closer to the mothers, as well as including husband as main target of the MCN program promotion.

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Differences of Height-For-Age Z-Score of Children Under 2 Years in Indonesia based on Infectious Disease, Feeding Practices and the Environment

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Keywords: Hypertension · Menopause · Elderly women
Background/Aims: Stunting is one of the serious nutrition problems in Indonesia. Stunting has impacts on the development of human resources, the economy and national development. Height-for-age is an anthropometric indicator used to assess stunting in children. This study aimed to look at differences of height-for-age Z-score based on infectious diseases, feeding practices and the environment. **Methods:** The study design was cross sectional using the results of the Indonesia's Health Research Survey (*Riskesda*s 2013) with 9,688 children aged 0–23 months. Data were analyzed using independent t-test. The variables included were history of diarrhea and ARI, history of initial breastfeeding, exclusive breastfeeding, latrines, sources of drinking water, open defecation, and hand washing with soap. **Results:** The average of height-for-age Z-score was $-1.07 + 2.2$ with the lowest of -5.9 and the highest of 6.0. The results found that the average of height-for-age Z-score children from families using unimproved latrines was significantly lower by 0.27 points and children living in families with open defecated were significantly lower by 0.41 points. On the contrary, the average of height-for-age Z-score children who were exclusively breastfed was significantly lower by 0.17 points. **Conclusion:** There was a relationship between the use of latrines, open defecation and exclusive breastfeeding with height-for-age. Environmental-based interventions are needed to prevent stunting in Indonesia. In addition, the need for further research on exclusive breastfeeding with stunting in Indonesia.

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Breastmilk Substitute Promotion and Label Violations in Point-of-Sale Across Six Provinces of Cambodia

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Keywords: Breastfeeding · Breast-milk substitute · Promotion · International code of marketing of breast-milk substitutes
Background/Aims: Commercial promotions for breastmilk substitutes (BMS) are highly prevalent in Cambodia, threatening optimal breastfeeding practices. The Royal Government of Cambodia adopted the International Code of Marketing of Breast-milk Substitutes into national regulation Sub-Decree 133 (SD133) in 2005 and in 2014 began concerted efforts to develop a monitoring and enforcement system for SD133. **Methods:** Cross-sectional surveys were carried out in six provinces to document point-of-sale (POS) and labeling SD133 violations in 2015 and in 2018. BMS commercial promotional activity in 66 purposively selected retail locations across 6 provincial capitals and 12 district towns was assessed. All BMS products found for sale were purchased and their labels reviewed using a 24-point checklist of label requirements from SD133 and the International Code. The proportion of stores which had POS promotions and total number of POS promotions were calculated, along with the mean label score. Descriptive comparisons were made between 2015 and 2018. **Results:** Across provinces, 137 BMS commercial promotions were observed in 2015 and 144 promotions in 2018. The percentage of stores with promotions increased from 57.8% in 2015 to 75.8% in 2018, but the median number of promotions per store decreased from 3 (IQR 2–5) to 2 (1–3). The most frequently observed promotional technique changed from informational material (57.7%) to display (63.2%). Mean product label scores increased, indicating better adherence to SD133. **Conclusion:** These documented improvements and continued violations will inform the Royal Government's ongoing efforts to implement a monitoring enforcement system to control BMS promotion and protect breastfeeding.

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Physical Activity Levels of Malaysian Vegetarians and its Associated Factors

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Keywords: Physical activity levels · Vegetarians · Socio-demographic · Lifestyle

Background/Aims: The physical activity levels remained unclear among Malaysian vegetarians. This study aimed to determine the physical activity levels and its associated socio-demographic and lifestyle factors among vegetarians. **Methods:** This cross-sectional study was conducted among 273 vegetarians from the selected community centers in Klang Valley. The data on socio-demographic characteristics, vegetarianism practices and lifestyle factors (cigarette smoking, alcohol consumption, depression, anxiety, stress and sleep quality) were collected using a set of self-administered questionnaire. Global Physical Activity Questionnaire (GPAQ) was used to determine the physical activity levels of the vegetarians. **Results:** A majority of the vegetarians were female (64.8%) and Chinese (54.9%), with an average age of 47.5 ± 13.1 years. About two in five vegetarians were lacto-ovo-vegetarians (44.0%), with an average of 14.2 ± 9.6 years of practicing vegetarianism. Overall, nearly half of the vegetarians (46.2%) had low physical activity levels. Older vegetarians were more physically inactive as compared to younger ones (F = 3.53, p = 0.031). A low level of physical activity was significantly associated with being females ($\chi2 = 7.4$, p = 0.024), Chinese ($\chi2 = 9.85$, p = 0.007), married ($\chi2 = 12.08$, p = 0.017), high total household income level ($\chi2 = 11.23$, p = 0.024), non-anxiety ($\chi2 = 11.50$, p = 0.003), and non-stressed ($\chi2 = 13.49$, p = 0.001). However, education level, employment category, smoking behavior, alcohol consumption, depression, and sleep quality were not significantly associated with physical activity levels (p > 0.05). **Conclusion:** Physical inactivity was common among Malaysian vegetarians. Future prospective studies are needed to determine the causal associations between those identified factors and physical inactivity among Malaysian vegetarians.

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Vegetable Intake at Breakfast and Associated Factors among Young Adults in Japan

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Keywords: Breakfast · University students

Background/Aims: In Japan, the amount of vegetable intake in young adults, especially at breakfast, is low. We aimed to examine the factors associated with vegetable intake at breakfast among young adults. **Methods:** In 2016, a self-administered questionnaire survey was conducted at a Japanese university. The questionnaire measured the frequency of ≥70 g vegetable intake at breakfast, lifestyle, eating habits, environmental factors and attitudes (including the variable "perceived behavior control (PBC)", from the Theory of Planned Behavior. The data of 1,455 male students who usually ate breakfast were analyzed. They were divided into two groups based on the median of the frequency of vegetable intake, and the above factors were compared using a chi-squared test by living condition. The significant factors were subsequently entered into a logistic regression analysis as independent variables. **Results:** Eating breakfast with family or friends and PBC were positively associated with vegetable intake in students living with their family. Often doing one's own cooking, having knowledge about a well-balanced diet, and PBC were positively associated with vegetable intake in students living alone. **Conclusion:** Along with PBC, different factors pertaining to an individual's living condition may need to be considered to increase vegetable intake at breakfast.

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Changes in Eating Behaviors of Pupils in China between 1998, 2008 and 2015

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Keywords: Eating behavior · Pupils

Background/Aims: Eating behavior of children is of great significance to life-long health and it has changed a lot through time. The aim was to study the changes in eating behaviors of Chinese pupils, and to provide evidence for nutrition education and intervention strategies. **Methods:** This research was based on the eating behavior surveys conducted in 1998(n = 5,509), 2008(n = 4,527) and 2015(n = 12,197). **Results:** The proportion of eating breakfast everyday was 83.4%, 76.9% and 88.5%, while the proportion of skipping breakfast was 1.0%, 3.0% and 1.3%. The proportion of adequate nutrition quality breakfast was 9.8%, 15.4% and 41.7%, while the proportion of poor nutrition quality breakfast was 56.7%, 84.7% and 31.8%. The proportion of pupils eating snacks was 92.4%, 97.9% and 96.4%, fresh fruits and vegetables had always been the most commonly consumed snacks, followed by grains and ice-

cream in 1998 and 2008, and dairy and grains in 2015. Pupils surveyed consumed western fast food increased from 2.66 to 4.86 times a month and they consumed Chinese fast foods 1.93 and 1.85 times a week. Milk had always been the most commonly consumed beverage, followed by carbonated beverages and fruit & vegetable beverages in 1998, tea beverage and other beverages in 2008, fruit & vegetable beverages and tea beverage in 2015. **Conclusion:** Pupils' eating behavior had changed a lot, both in good and bad direction. Therefore, nutrition education for pupils and parents should be encouraged to promote pupils to develop healthy eating behaviors.

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Determinants of Health-Promoting Lifestyles of Indian University Students

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Keywords: Healthy lifestyle nutrition · Health promotion · India
Background/Aims: The rising prevalence of non-communicable in young Indians underscores a compelling need to instill healthy lifestyles in children and adolescents. The present study aimed to assess the health-promoting lifestyles of newly inducted young adult students to different tertiary education institutes under an international university. **Methods:** The study collected information on socio-demographic factors and health-promoting lifestyle behaviors of young adults using a modified health-promoting lifestyle profile scale (HPLP). The total HPLP scores and sub-scale scores for six domains were estimated. Univariate and age and gender-adjusted multivariate analysis were conducted to identify the determinants of health-promoting lifestyle scores. The study was conducted across India in 28 institutes and recruited 4,253 participants from 6 campuses. **Results:** Gender-wise distribution of total HPLP scores and sub-scale scores indicated significant differences between female and male students except for spiritual growth (P = 0.300). Female students scored significantly higher total HPLP than male students (139.8 vs 137.6, P = 0.000). Potential determinants of the total HPLP of the multivariate models showed that the students from management and law, and social sciences and humanities faculties scored lower in total HPLP compared to students enrolled in the Science, Technology, Engineering and Mathematics (STEM) faculty (3.15 (CI: 1.61, 4.68) and 4.90 (CI: 3.24, 6.58) respectively). Students from North zone campuses (b –0.62 (CI: –0.92, –0.32)) than west zone, and international students (b –1.18 (CI: –2.11, –0.24)) than domestic students had lower nutrition sub-scale scores. **Conclusion:** The faculty, zone and residential status predicted the health-promoting lifestyle of Indian university students.

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Social and Behavior Change to Improve Chronic Malnutrition in Refugee Children in Camps along the Thailand-Myanmar Border

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Keywords: Stunting · Refugee · Social behavior change
Background/Aims: Along the Thailand/Myanmar border, ~86,000 Myanmar refugees remain in 9 camps, largely dependent on outside food aid. To address the continued high rate of stunting (40.8%, 2013); increase community awareness of recommended Infant and Young Child Feeding (IYCF) practices; and equip CBO/INGO/NGO partners to conduct and sustain effective promotion, 'Healthy Babies, Bright Futures' IYCF Campaign using Social and Behavior Change (SBC) was implemented in early 2014. **Methods:** This initiative uses community-based implementation, behavior change communication and, as participation incentive, BabyBRIGHT, a nutrient-dense complementary food. All children 6–24 months of age were enrolled. Pregnant women, nursing mothers and extended family members (e.g., grandmothers, fathers and youth) who often influence infant feeding practices in families, were included. The Campaign focuses on maternal nutrition, exclusive breastfeeding for the first 6 months of age, and continued breastfeeding until 24 months with appropriate complementary feeding between 6–24 months of age. **Results:** TBC and health partners' biennial nutrition survey (2017) of children 6–59 months (n = 3,905) indicated that although stunting prevalence was "high" (WHO criteria) at 31.8% (95% CI 30.4%-33.3%; range 18.8%-41.7%), there has been significant progress with a 9.0% reduction over 4 years, since 'Healthy Babies, Bright Futures' implementation (2013–2017). **Conclusion:** 'Healthy Babies, Bright Futures', using SBC, seems to have contributed towards reducing stunting in the 9 refugee.

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Estimating the Prevalence of Zinc Deficiency in the Philippines: Results of the 2013 National Nutrition Survey

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Keywords: Zinc status · Zinc deficiency · Public health nutrition · Malnutrition
Background/Aims: Zinc is a trace element involved in numerous biochemical processes. Its deficiency results in growth retardation, delayed sexual maturity and increased susceptibility to infections. The study aimed to analyze the magnitude of zinc deficiency among Filipino population across all age group and physiological

state. **Methods:** The 8th National Nutrition Survey (NNS) data collected by the Food and Nutrition Research Institute, Department of Science and Technology (FNRI-DOST) was used in the study. Data were disaggregated by age, sex, physiological state, place of residence and wealth quintile. Data were analyzed using Stata 12.0. **Results:** Results showed high prevalence of zinc deficiency (25.6%) which was considered high public health significance. By age group and physiological state, highest prevalence of zinc deficiency was observed among the elderly (36.3%) followed by adult (28.1%) and lactating women (25.2%). Children residing in rural areas are more at risk than those residing in urban areas, except 13–19 years old. Adults and elderly were more zinc deficient in urban than in rural areas. Lactating mothers in rural areas were more zinc deficient than in urban areas. Among children and adolescents, as the wealth index increases, zinc deficiency decreases, except for 13–19 years old wherein the middle income has the lowest. **Conclusion:** High prevalence of zinc deficiency exists among Filipinos across all age groups. Since zinc is required by the body to support immune functions and assists in various cellular activities, supplementation and food fortification should be implemented and strengthened to curb the problem.

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Body Image Influences Under-Reporting of Energy Intakes in Young Japanese Female University Students with Nutrition Knowledge

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Keywords: Body image · Energy intake · EI:BMR · Japanese females
Background/Aims: Young Japanese females have been reported to have a strong desire for thinness and body dissatisfaction. While body dissatisfaction has been suggested as an influencing factor for under-reporting their energy intake (EI), studies focusing Japanese females are scarce. The present study aimed to examine an influence of body image on EI using young Japanese female university students with nutrition knowledge. **Methods:** A total of 101 young Japanese females (aged between 18 –29 years) who enrolled in a nutrition degree program participated in the study. Participants completed 1) a questionnaire booklet including the Ben-Tovim Walker Body Attitudes Questionnaire (BAQ), 2) a brief-type self-administered diet history questionnaire (BDHQ), 3) physical activity using a three-day physical activity record and an activity meter, and 4) detailed anthropometric and body composition assessments. Based on EI estimated from BDHQ and basal metabolic rate (BMR) estimated from a standard equation, EI:BMR was determined. All statistical analysis was conducted using SPSS program with significance level of 0.05. **Results:** Based on the EI:BMR cut-off point of 1.35, 60 participants (59.4%) were considered as under-reporters. Under-reporters were significantly (p < 0.01) heavier and had greater sum of eight skinfolds, and percentage body fat (%BF). Their body mass index (BMI) were also significantly (p < 0.05) different, although they were within the normal range. Regression analyses indicated that the BAQ total score

was associated with the EI:BMR and EI. **Conclusion:** Body image influenced EI in young Japanese females, even though they have normal BMI and nutrition knowledge.

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Problems Recognized by Caregivers Related to Infants Eating Habits from the Child Nutrition Surveys 2015 in Japan

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Keywords: Infant feeding · Preschool children · Japan · Problems of eating
Background/Aims: In the sync of the rapid super-aging and decreasing birthrate in Japan, supportive social environment for caregivers of infants especially towards healthier eating should be more strengthened in national nutrition policies. Although the national survey of 2015 revealed 80% of caregivers had concerns about infants eating habits, the detailed factors of the concerns had not been analyzed in depth. We therefore investigated problems recognized by caregivers related to infants eating habits by secondary analyses of the national survey to propose possible options to support the caregivers in maternal child health care systems in Japan. **Methods:** We reanalyzed the dataset of 2015's survey with authorized permission. A national representative sample of 3,871 caregivers (mostly mothers) of children aged one to 71 months were included in the analyses. **Results:** The number of problems and things they care about eating relates to their conditions of complacency and where they take care of infants. The number of problems were less in those who can easily access to the places or persons for consultation. **Conclusion:** Enrichment of nursing school, kindergarten, and support of public health centers are expected to provide opportunities to support the caregivers for the establishment of healthier eating habits in early stage of childhood.

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Discrepancy in Reported and Analyzed Sugar Content in Packaged Foods in India

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Keywords: Sugar · Packaged foods · Nutrition information panel · Di-nitro-salicylic-acid
Background/Aims: Packaged-foods report sugar on Nutrition-Information-Panel (NIP). Information on sugar content can be used to select low-sugar foods to reduce the risk overweight/obesity that may result in type-2 diabetes. Therefore, the present investigation aimed at evaluating the accuracy in reporting of sugar content on NIP of the packaged-foods. **Methods: Results:** One-hundred-and-one purposively selected packaged-foods were ana-

lyzed for sugar content by Spectrophotometric method using Di-nitro-salicylic-acid (DNSA). Result of the 101 selected products, 87 reported sugar content on NIP. Noodles, pasta and macaroni (10%) had the highest percentage of products under-reporting (reported values <10% of the analyzed values) the sugar content and chocolates (6%) had the highest percentage of products over-reporting (reported values >10% of the analyzed values) the same. Savory snacks (p ≤ 0.01, t = 4.572) showed significant difference between reported (4 g/100 g) and analyzed (7.34 g/100 g) sugar content. Analyzed sugar content was found to be higher than the reported values in the food categories namely, jam, marmalades and jellies, ready-to-eat sweets, ketchups and sauces, malted beverages, sweet cream wafers, cakes, sweet biscuits, soups, cereal and milk-based baby foods, cornflakes, oats and muesli, savory snacks, noodles, pasta and macaroni, ready-to-cook foods and popcorn. Of the 14 products that did not report sugar content on NIP, majority were savory snacks (50%) with values as high as 14.4 g/100 g of food (mean = 6.9 ± 5.5 g/100 g of food). **Conclusion:** There is lack of accuracy in reporting sugar content on NIP. Therefore, there is a need to improve regulatory compliance for labeling of packaged-foods for improved Public Health and Nutrition outcomes.

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The Difference of Energy Density Diet based on Nutritional Status of Adult Woman in Kebon Jeruk

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Keywords: Adult woman · Body mass index · Energy density · Nutritional status
Background/Aims: An increase of obesity is found in adult women. This condition is related to unbalance intake, and they choose to consume high energy density diet such as high fat, high sugar, and refined grains. The study aimed to analyze the difference in energy diet density between adult woman with normal nutritional status and overweight in Kebon Jeruk. **Methods:** This study used cross-sectional design method with random sampling. This study included 711 adult women. **Results:** The study showed among 711 adult women, 85% were overweight with average of BMI 27.92 ± 4.4 kg/m^2. Based of 24-h Food Recall, it was shown that 72.6% adult woman consumed high energy density diet (>2.09 kcal/g). Based on analytical statistic, it showed significant difference (p < 0.05) in BMI score where the majority of adult women who consumed high energy density diet were shown to be overweight and vice versa. **Conclusion:** There was a different in energy density between adult women with normal nutritional status and overweight.

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Differences in Dietary Intake of Women with Standard Weight But Varying Body Fat Percentages, in Japan

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Keywords: BMI · Body fat ratio · Young women · Japanese
Background/Aims: Because of the strong desire to be thin, the proportion of young women who are underweight (BMI <18.5) is high in Japan. However, there are so-called "hidden obese people" whose body fat ratio (BFR) is high despite having a normal BMI. These patients have excessive accumulated adipose tissue, referred to as visceral fat type obesity, resulting in the onset of lifestyle-related diseases leading to arteriosclerosis. We aimed to identify factors that contributed to the prevention of hidden obesity, by clarifying the differences in dietary intake between both groups. **Methods:** In this study, young females with a standard BMI (18.5< BMI ≤25.0) were divided into two groups: one group with participants having BFR ≥30.0 (hidden obese group) and the other group with participants having BFR <30.0 (standard group). We measured the height, weight and body fat ratios for Japanese female college students (n = 670) and assessed their dietary intake. The differences in the average food and nutrient intake for the hidden obese group (n = 160) and standard group (n = 368) were examined using a Student's t-test or Welch's t-test. Food and nutrient intake were energy adjusted using the residual method. **Results:** Energy and fat intake of the standard group were high (p = 0.044 and p = 0.028, respectively). Within the hidden obese group, the carbohydrate, cereals, confections, and sugary beverage intake was high (p < 0.05). **Conclusion:** This study suggested that reducing high carbohydrate dense foods was effective in preventing hidden obesity.

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Study on Number of Evacuees and Dietary Quality in Emergency Shelter

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Keywords: Disaster nutrition · Emergency shelters · Great East Japan Earthquake · Dietary quality
Background/Aims: We previously reported that emergency shelters with large numbers of evacuees had a lower frequency of meal provision about one month after the Great East Japan Earthquake. However, it is unknown whether the number of evacuees affected the dietary quality or not. The purpose of this study was to clarify the effect of the number of evacuees on the dietary quality. **Methods:** We reanalyzed the data obtained from the survey at the emergency shelters by Miyagi prefectural government about one month (n = 332), two months (n = 241) and three months (n = 49) after the Great East Japan Earthquake in 2011. Shelters were classified into three groups according to the tertile of the number of evacuees accommodated. **Results:** One month after the disaster, emer-

gency shelters with large numbers of evacuees had a lower frequency of meals. The emergency shelters with large and small numbers of evacuees (compared with medium numbers) had a lower percentage energy provision to reach "Nutritional Reference Values for Disaster". There was no difference in proteins, Vitamin (hereafter V) B1, VB2, and VC. Two months after the disaster, the emergency shelters with large and small numbers of evacuees (compared with medium numbers) had a lower percentage of proteins and VB2 provision to reach "Nutritional Reference Values for Disaster". Three months after the disaster, there was no significant difference. **Conclusion:** These results suggested that the nutritional status may deteriorate even if the number of evacuees was large and small.

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Contextualizing Motivations and Perceived Barriers of Healthy Nutrition and Lifestyle Behaviors among Malaysian Adults with Metabolic Syndrome

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Keywords: Metabolic syndrome · Nutrition · Lifestyle · Health Belief Model · Focus Group Discussion

Background/Aims: Metabolic Syndrome (MetS) is a clustering of risk factors that increases the risk of diabetes and cardiovascular diseases and is closely related to individuals' nutrition and lifestyle behavior. An effective health promotion program must provide age-appropriate care information that addresses critical factors such as physiological function, social psychology, and emotional and health literacy in order to empower these patients to self-manage their condition and to enhance their self-care-related motivation and confidence. **Methods:** This study qualitatively analyzed a series of focus group discussions involving twenty-one Malaysian adults with MetS (N = 21) to contextualized their understanding of MetS particularly their perceived motivation and barriers of healthy nutrition and lifestyle behavior. All sessions were recorded and transcribed verbatim. Thematic framework analysis approach was applied to the data using a coding framework developed from Health Belief Model. **Results:** Seven main themes; three motivations and three perceived barriers and one subtheme were identified in the analysis of FGD. Motivations for healthy nutrition and lifestyles behavior were weight gain and physical appearances, personal experience of adverse complications and good family and social support. The identified perceived barriers were healthcare as a business model, healthy change is difficult and expensive and cultural influence on food intake. Besides, inadequate knowledge on MetS was a subtheme identified. **Conclusion:** Nutrition and lifestyle behaviors of adults with MetS were highly affected by the several motivations and perceived barriers. Information delivery and lifestyle promotion should address these aspects to increase program adoption and adherence, ensuring success of a community-based lifestyle intervention.

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Evaluating Nutrition Students' Knowledge of Food Safety in Indonesia: Multi-Strata Comparison Review

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Keywords: Higher education · Nutrition education · Food borne disease · Students with nutrition major

Background/Aims: Knowledge of food safety is one of many requirements that nutrition students should master. The quality of food organization and community education associated with food safety depend on the quality of the educator (in this context, nutrition students), whereas the quality of nutrition graduates depends on the educational quality of the school. This study aimed to evaluate the food safety knowledge of all students with a nutrition major in Indonesia. **Methods:** A cross-sectional study was conducted with a random cluster sampling method. The research sample size was 482 students, consisting of 3 nutrition educational strata (associate degree D3; bachelor degrees D4 and bachelor degrees S1) in Indonesia. Sample respondents were asked to answer a validated food safety knowledge questionnaire. Food safety knowledge differences among the 3 strata were measured with an ANOVA test. **Results:** Bachelor degree (S1) respondents had the highest results (5.84 ± 1.52) compared to associate degree (D3) (5.46 ± 1.76) and bachelor degree (D4) respondents (5.52 ± 1.49). However, no significant knowledge difference among the groups was found [$F(2.479) = 2.83$, $p = 0.06$]. The mean scores of food safety knowledge of nutrition students at various levels of education were 5.46, 5.52 and 5.84, respectively. A specific program should be implemented to improve food safety knowledge among Indonesian nutrition students. **Conclusion:** Food safety components, such as food storage principles, safe food consumption principles, food-borne disease principles, handling food at risk of microbes causing food-borne disease and subjects at risk of food-borne disease, seem to influence food safety knowledge among Indonesian nutrition students.

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The Acceptability of Weekly Iron Tablet Supplementation among Adolescent School Girls in Yogyakarta City: Implications for Adolescent Anemia Control Programs

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Keywords: Acceptability · Blanket approach · Compliance · Weekly iron supplementation

Background/Aims: The study aimed to assess the acceptability and school's readiness of Weekly Iron Supplementation Program

(WISP) (qualitative component) and factors which may influence the compliance of WISP among adolescent school girls (quantitative component). **Methods:** A mixed method study was carried out in 6 schools in Yogyakarta during January to April 2018. Totally, 211 adolescence school-girls aged 12–18 years involved in the cross-sectional survey and followed by 4 FGD and 7 in-depth interviews. The respondents were assessed for their BMI/Age, Hemoglobin and Serum Ferritin, habitual food intake and the acceptability of WIPS. **Results:** Almost a quarter of adolescent school girls suffered from iron deficiency anemia. Nine in every 10 participants ever received the tablet but only 62% of them who ingest the supplement based on self-reporting compliance. Findings that emerged during FGD showed that teachers were not ready for "fixed-iron weekly day" in the school and the students perceived that parents and teachers had a role for good WISP's adherence. The logistic regression test indicated that the respondents were more likely to take the tablet if feeling good taste experience (OR(95% CI): 12.70 (2.0–84.4). Once the respondents perceived the odor of tablet was not good, low peer support and side effect experienced decrease the willingness to take the tablet, respectively (OR(95% CI): 0.20(0.05–0.50); 0.30(0.10–0.80); 0.40(0.03–0.40)). **Conclusion:** The organoleptic properties of tablet and the support form peers, teachers, and parents were the inhibitor and reinforcing factors and should be considered in the future action of the adolescent anemia control program.

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A Nutrition Educational Module Improves Knowledge of Nutrition among Preschoolers

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Keywords: Nutrition education · Preschool children · Nutrition module

Background/Aims: Objective of this study was to evaluate the effect of the nutrition educational module on knowledge of nutrition among preschool children. A quasi-experimental study with pre-post-test and control group design was used for this study. **Methods:** This study was setting at 5 government kindergarten in 3 different districts at Riau Province, Indonesia. 676 students participated in this study that were divided into 307 for intervention group and 357 for control group. Intervention of this study was 12 activities of nutrition education that given in four consecutive days a week for intervention group based on Nutrition Educational Module for Preschool Children. All of the activities were delivered by teacher that had been trained for the module prior the activities. Monitoring and evaluation questionnaires were used during the activities took place by trained observer and teachers. In-depth interview was given to selected teacher representing each school after the intervention was completed to evaluate the modules and activities. Changes in student nutrition knowledge before and after the intervention were assessed using questionnaire. **Results:** There was an increased in nutrition knowledge score from 75.70 to 81.54 among control group, and 74.51 to 88.29 among intervention group (all P < 0.000). Students and teachers also found that the module was applicable and easy to understand hence would improve knowledge of nutrition. **Conclusion:** Nutrition educational module for preschool children could improves nutrition knowledge among preschool children.

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Does Children's Psychosocial Factors Towards Healthy Meal Preparation Advocates Breakfast Consumption?

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Keywords: Breakfast · Healthy meal preparation · Psychosocial factors · Malaysia

Background/Aims: Breakfast skipping in children led to lower nutrients intake and childhood obesity; however, it is also a potentially modifiable behavior. Particularly, children's psychosocial factors towards hands-on healthy meal preparation may have the influence on breakfast consumption. Hence, this cross-sectional study aimed to identify children's psychosocial factors (knowledge, attitude, practice and self-efficacy) towards healthy meal preparation as determinants for breakfast consumption. **Methods:** Stratified random sampling was used to select government primary schools (n = 8) from zones in Kuala Lumpur. In total, 200 children aged 9 to 11 participated in the study. Children's usual breakfast consumption was self-reported while psychosocial factors towards healthy meal preparation was assessed using a validated questionnaire. **Results:** Nearly half (43.5%) of the children skipped breakfast at least once a week. Regular breakfast eater reported better knowledge [5.99(2.19) vs 5.20(2.40), p = 0.015], attitude [28.29(3.81) vs 26.80(3.81), p = 0.007] and self-efficacy [35.01(6.03) vs 33.09(5.79), p = 0.024] towards healthy meal preparation, as compared with breakfast skipper. Breakfast consumption was positively correlated with knowledge (r = 0.198, p = 0.005), attitude (r = 0.218, p = 0.002) and self-efficacy (r = 0.191, p = 0.007). Further, multiple linear regression revealed that children with good knowledge towards healthy meal preparation (β = 0.16, p = 0.031) were more likely to eat breakfast. **Conclusion:** Our findings demonstrated that children's psychosocial factors towards healthy meal preparation were positively associated with breakfast consumption. Hence, it is imperative to instill hands-on healthy meal preparation in children as strategy to encourage breakfast consumption, in relation to improving their diet quality and weight status.

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Multicomponent Nutrition Intervention on Teachers, Parents, and Students toward the Knowledge and Attitude about Fruit and Vegetable Consumption

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Keywords: Attitude · Fruit and vegetable consumption · Knowledge · Multicomponent · Intervention

Background/Aims: Fruit and vegetable consumption is one of important component in Balanced Nutrition, but fruit and vegetable consumption in elementary school students (ESS) grade 5 and 6 was still low. The purpose of this study was to determine the impact of multicomponent nutrition intervention in teachers, parents and students toward the knowledge and attitude about fruit and vegetable consumption. **Methods:** The study used a quasi-experimental design with pre-post intervention method with nutrition education to three groups subject using comic and pocket book in Nganjuk, East Java from February to May 2017. Subjects involved in this research were 10 teachers, 31 parents and 31 ESS. Data analysis was with paired difference test in three measurements. **Results:** Based on Friedman's test, the knowledge and attitudes of the three subjects increased significantly (p < 0.05). The types of questions that were being improved were types of fruits and vegetables that contain potassium and the portion of fruits and vegetables that must be consumed. Subjects who belong to the category of having good knowledge also experienced a significant increased (p < 0.05). The attitude scores on the three subjects increased significantly (p < 0.05). Positive response to attitude of fruit and vegetable consumption increased in the content of fruits and vegetables. The number of subjects who had a good attitude towards fruit and vegetable consumption also experienced a significant increased (p < 0.05). **Conclusion:** Multicomponent nutrition intervention could improve knowledge and attitudes towards teachers, parents and ESS regarding fruit and vegetable consumption.

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The Challenges in Translating the National Food and Nutrition Action Plan Mandate into the City Level Food Policy in Indonesia

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Keywords: Urban nutrition · Urban policy · Governance

Background/Aims: The government of Indonesia mandates all districts/cities government to implement the 5-yearly National Food and Nutrition Action Plan by developing the municipal-level action plan. However, Indonesia has no specific food and nutrition policies as references for developing policies for urban setting. The study aimed to understand how the city develops an implementable food and nutrition action plan complying with the national mandate and the adjustments to fit the policy with urban characteristics. **Methods:** This was an observational study conducted in the city of Surabaya. **Results:** Because city has no sufficient capacity to self-produce the food, therefore the food and nutrition policy heavily focuses on securing food distribution and affordability, which were not among the focuses of the general national policy. Determining the boundary to which extends the policy applies beyond the city authority was also challenging because foods come from various regions outside the city. To prioritizing nutrition issues on the action plan, it must be ensured that the issues were also included in the Regional Medium-Term Plan of the city. Otherwise, it will not be implemented regardless the national policy mandates it. Unfortunately, food and nutrition issues were less prioritized among the urban development agendas. It is difficult to translate the national mandate to the city-level food and nutrition policy when there was no clear, differentiated policy for urban area. **Conclusion:** The national mandate should be in a more powerful legislation form to obligate city government in putting the food and nutrition issues in their city agenda.

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The Roles of Municipal Government in the City Food System for a Nutritious Diet: A Landscape Analysis in Jakarta and Bogor City

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Keywords: Food system · Cities, malnutrition · Municipal government

Background/Aims: Indonesia is rapidly urbanizing that 55% of the total population already lived in cities in 2017. Nevertheless, the occurring urbanization has not impacted favorably, where food insecurity and malnutrition are still haunting the urban dwellers. While food systems are largely constituted by markets of private sectors, municipal government plays influential roles to shape a well-functioning system so that safe and nutritious foods become available, affordable and appealing for city population. This study analyzed the roles of municipal government in the food system policy in the megacity (Jakarta) and medium city (Bogor). **Methods:** This was a qualitative study utilizing desk reviews and in-depth interviews with key stakeholders at the municipal government, conducted between April-August 2017. **Results:** The study showed a similar situation in both cities. Staple food security and food safety remained as major focus of local government actions. Interventions to improve food environment that can supply and increase nutritious food consumption were lacking. The food system framework was not well understood, so the food and nutrition policies in both cities were disjoint and did not constitute in a comprehensive and systematic manner. Sectoral ego that hindered inter-sectoral coordination in implementing actions also existed. **Conclusion:** Several strategies to improve the food system situation in the cities can be suggested: familiarizing the government with food system concept and its linkage to malnutrition, strengthening the existing coordinating body such as Food Security Council, and collating data of determinant of dietary choices among city inhabitants to provide more insights of where the municipal government must put intervention on.

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Household Income Is Associated with Food and Nutrient Intake in Japanese Schoolchildren, Especially on Days without School Lunch

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Keywords: Household income · Nutrient intake ·Children · School lunch

Background/Aims: The study aimed to examine the association between household income and the intake of foods and nutrients of Japanese schoolchildren, and any differences between days with and without school lunch. **Methods:** This was a cross-sectional study. Children, with the support of their parents, kept dietary records with photographs for 4 days (2 days with school lunch and 2 days without). The socio-economic status of each family was obtained from a questionnaire completed by the parents. All students in 5th grade (10–11 years old) at 19 schools in 4 prefectures and their parents (1,447 pairs of students and parents) were invited to take part in this study; 836 pairs of complete data sets were analyzed. **Results:** The average results of 4 days of dietary records showed that lower income level was associated with a lower intake of fish/shellfish, green vegetables, and sugar at the food group level, a lower intake of protein and several micronutrients, and a higher energy intake from carbohydrates at the nutrient level among the children. These associations between income and food/nutrient intake were not significant on days with school lunches, but were significant on days without school lunch. **Conclusion:** Our study confirmed an association between household income and amounts of foods and nutrients consumed by Japanese schoolchildren, and suggested that school lunches play a role in reducing disparities in the diets of children from households with various incomes.

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Reliability of Nutritional Knowledge and Supplement Habits Questionnaires for Malaysian Disabled Athletes

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Keywords: Disabled athlete · Knowledge · Reliability · Supplement · Validity

Background/Aims: Nutrition has become one of the crucial elements in sports as it can enhance the sports performance of athletes. Currently, there is no questionnaire available especially for Malaysian disabled athletes, that can help to identify the athletes' level of nutritional knowledge and their supplement habits. Thus, this study has developed valid and reliable questionnaires on nutritional knowledge and supplement habits for Malaysian disabled athletes. **Methods:** The sample size of this study was 23 elite disabled athletes at Malaysian Paralympic Excellence Centre, Kampung Pandan, Kuala Lumpur. Athletes with intellectual or deaf impairments were excluded from this study. There were two reliability tests used in this study; internal consistency and test-retest reliability. The data for internal consistency and test-retest reliability were analysed using Cronbach's Alpha and Pearson Correlation Coefficient, which were calculated by using the Statistical Package for Social Sciences (SPSS) version 21 software. **Results:** As a result, the Cronbach Alpha values for nutritional knowledge and supplement habits questionnaires were 0.733 and 0.746 respectively. These values indicated that these questionnaires are reliable. The correlation value for test-retest reliability for nutritional knowledge questionnaire was 0.680, a moderate positive correlation. Meanwhile, the correlation value for the supplement habits questionnaire was 0.708, a high positive correlation. These correlation values for both questionnaires proved that they are reliable and have positive temporal stability. **Conclusion:** To conclude, the developed questionnaires are reliable and able to helps the Malaysian disabled athletes to identify the level of nutritional knowledge and their supplement habits.

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Comparison of Nutritional Status and Physical Activity between Users and Non-User of Dietary Supplement

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Keywords: Dietary supplement · Nutritional status · Physical activity · Female

Background/Aims: This study aimed to compare the nutritional status and physical activity between users and non-users of dietary supplements. **Methods:** This was a cross-sectional study which involved 123 female workers (age 18 to 60 yrs.) from different organizations in Kota Kinabalu, Sabah. Indicators of nutritional status were anthropometric (weight, body mass index, waist circumference and body fat percentage), blood pressure and dietary intake (calorie, macro and micronutrients). Structured questionnaire was used to examine the frequency and type of dietary supplement use. Physical measurements were taken using standard procedures. 3 days 24-hour diet recall was performed to assessed calorie and nutrients intake. Physical activity was estimated using International Physical Activity Questionnaire (IPAQ) and step count by pedometer. **Results:** This study found that only 32.5% of respondents were dietary supplement user (n = 40). Of these, vitamin C (55.0%) was the most widely consumed, followed by honey product (35.0%) and fish oil (20.0%). Comparative analysis showed that both users and non-users of dietary supplements had a similar anthropometric status. However, users of dietary supplement had

significantly higher mean of blood pressure than non-users (systolic, p = 0.036; diastolic p = 0.024). In terms of diet intake, dietary supplement users has better intake of protein (p = 0.009), vitamin C (p < 0.001) and calcium (p < 0.001) compared to non-users. Besides, the users had significantly higher physical activity score (p = 0.008) and step counts (p = 0.046) than non-users. **Conclusion:** It can be concluded that users of dietary supplement has better dietary status and physical activity than non-users.

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The Nutritional Status of Children Under-Five in Teenage Families in Indonesia 2013

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Keywords: Stunting · Malnutrition · Emotional disturbance · Clean and healthy lifestyle

Background/Aims: Early marriage has become a worldwide problem and so does nutritional status of children under-five. Young moms are not ready to be married in terms of reproductive or mental health. Early marriage contributes to the poverty cycle and also helplessness in woman. This article aimed to analyze factors related to nutritional status of children under-five, specifically in families with teenage moms. **Methods:** Population were families with children-under five based on National Health Research Survey (*Riskesdas* 2013). Samples were families of children-under-five with moms aged 10–19. Research design was cross-Sectional. Data analysis used logistic (chi-square test). Dependent variables were nutritional status of children, based on weight for height, weight for age, height for age. Independent variables were characteristics, emotional disturbance, clean-healthy lifestyle and height of parents with children under-five. Samples analyzed were 978 families with children-under-five. **Results:** Emotional disturbance in moms was related with malnutrition (weight for age, p = 0.005) and stunting (height for age, p = 0.012). Clean and healthy lifestyle was also related with malnutrition status (weight for age, p = 0.024). Mothers' emotional disturbances remained as significant factor related with child malnutrition in a multivariate analysis. **Conclusion:** Teenage moms were not ready emotionally and healthily in terms of parenting

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Differences in Social and Cultural Perception between Exclusive with Non-Exclusive Breastfeeding in Health Center of Kota Utara, Gorontalo

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Keywords: Breastfeeding · Support · Social perception

Background/Aims: The golden standard of feeding in infants and children begins immediately breastfeeding within 1 hour after birth. Breastfeeding exclusively start from birth until 6 months, then the baby gets complementary foods according to the needs of their growth and continues breastfeeding up to 24 months or more. The purpose of this study was to examine the differences in social perceptions culture between breastfeeding exclusively and not exclusively in Health Center of Kota Utara, Gorontalo City. **Methods:** Research method was quantitative analysis with an observational cross sectional study approach. The data collected were the characteristics of mothers and children and the perception of mothers with a total of 112 research subjects. **Results:** Results were that 58.9% of respondents gave exclusive breastfeeding consists of 64.30% younger mother and 78.90% respondents with tertiary education. 80.35% gave colostrum, 41.1% gave complementary foods to infants <6 months, 100% family support for exclusive breastfeeding, and 58.92% respondents had good perceptions. **Conclusion:** There were significant perceptual differences between mothers who give exclusive breastfeeding with non-exclusive ones.

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The Prevalence and Determinants of Dual Burden Malnutrition through a Life Cycle among Indonesian Households

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Keywords: Malnutrition · Household · IFLS

Background/Aims: The coexistence of both overnutrition and undernutrition is called dual burden malnutrition which emerged as the impact of the global nutrition transition and rapid socio-economic developments. While malnutrition still becomes an issue in Indonesia, the appearance of the late burden has become a new concern of its government. This study aimed to identify the determinant factors of dual burden malnutrition among Indonesian households using the latest wave of Indonesian Family Life Survey (IFLS) data. **Methods:** The data taken from this cross-sectional study were the pair of mother and child aged 2–18 who lived at the same households. Further, the age of the children was stratified into three stages, i.e.: under five of aged (<5 years), school-aged (5–12 years) and adolescence (13–18 years). Body Mass Index (BMI) and Weight-for-Height Z-score (WHZ) or BMI/age were used to determine the dual burden malnutrition. Household socio-economic factors were observed and examined using logistic regression. **Results:** The results showed that the prevalence of overweight mother/wasted children (OM/WC) at mother with school-aged children was the highest among other stratifications. Household economic levels were significantly associated with dual burden of malnutrition only at under five and school-aged children (p < 0.05). The households with higher economic levels, being in urban, and lower mother education were more likely have dual burden of malnutrition as well. **Conclusion:** The phenomenon of dual burden of malnutrition exists among Indonesian households across children's life stage. Further investigation is required to find and understand the dynamic of dual burden malnutrition within households

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Development of Nutrition Education Models for Selection of Vegetables, Fruits and Fish Consumption among Elementary School Children

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Keywords: Food choice · Fruit · Vegetable · Fish · Nutrition education

Background/Aims: Consumption behavior of low vegetable and fruits intake according to National Health Survey (*Riskesdas*) 2013 amounted to 93.5%, and increasing to 95.5% in 2018. The people of West Java Province consumed the lowest fish at 31 kg/cap/year. Research objectives was to develop a model of elementary school nutrition education. **Methods:** Formative study used cross sectional design and interview method in gathering information on Health Department, health centers, Education Department, headmaster and teachers. **Results:** The results of this study were 433 respondents from grade 5 school children from 8 elementary schools, 80% of school health program were not active, the methods most preferred by children to obtain information about nutrition was practice of cooking and tasting food with the most effective delivery time for nutritional information the respondents were selected 10 minutes for watching video. The unavailability of fruit vegetables at home and school was one of the reasons that respondents did not consume vegetables and fruit. Then another reason was because the vegetable taste was bitter, unpleasant and smelly. They did not consume fruit because it was expensive, and not consume fish because of spikes and smell. 95.4% respondents did not know about total portion and health impact of not consuming vegetables, fruits and fish. Assessment of nutritional status using BAZ were 1.2% and 7.5% of respondents were very thin and thin, and 11.5% were obese. **Conclusion:** Educational material should be developed to cover issues revealed in this study.

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Knowledge and Practice Nutrition Indonesian Guideline and Its Association with Nutritional Status in Adolescents Gorontalo District

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Keywords: Adolescents · Knowledge · Practice

Background/Aims: Nutrition problems in adolescents are important for improvement nutrition status until the stage of the life cycle. The aim was to assess association between knowledge, attitude and practice nutrition Indonesian guideline with nutritional status in adolescents. **Methods:** The research was cross sectional study, which was conducted in Islamic Junior High School 1 Model Limboto. Total samples were 251 students. Variable of nutritional status was measured with height for age and body mass index for age indicators. Variables on knowledge, attitude and practice nutrition Indonesian guideline were measured using questionnaire. **Results:** The study showed that body weight was 47.31 ± 11.15 kg, body height was 152.68 ± 6.36 cm and abdominal circumference was 71.21 ± 10.21 cm. Of the subjects, 6.8% were underweight and 23.5% were obese, and 10.0% were short. Meal skipping was 50.9% on breakfast, 44.6% on lunch and 47.4% on dinner. The knowledge score on the nutrition guideline was 41.89 ± 12.65 points, attitude 81.04 ± 6.95 points and practice 71.00 ± 9.75 points. There was no association between knowledge, attitude and practice with the nutritional status. **Conclusion:** Knowledge, attitude, practice on Indonesian nutrition guideline was not associated with nutritional status of children.

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Contribution of At-Home and Away-Home Foods to Children's Diet and Nutrition in Selected Locations of Bangladesh

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Keywords: Food preferences · Obesity · Nutrition security · Nutritional affluence

Background/Aims: With time, increase in income and urbanization street food is getting popular among children in Bangladesh. Food outside home is energy dense than those prepared at home and this contributes to nutritional deprivation and affluence. The present study examined how location choice (eating at home or away home) shape up daily diets of children and impact their nutrition. **Methods:** A 2X2 design was followed for location choices and all children from 233 households formed the sample. Dietary intake was obtained following 24-hour food weighing method and recall of foods taken outside home. Height and weight were also taken from these children. All children (441) under-18 (211 males and 230 female) from two statistically selected rural (172 households and 323 children) and two urban (61 Households and 118 children) sites constituted the study subjects. **Results:** The results suggest that street foods dominated the diets of urban than rural children. The numbers were three-fold higher (30%) in urban than in rural (10%) sites. The intakes represent 60% of their daily energy at-home and 40% away-home. Intakes away home increased with increase in age and income. A positive correlation was calculated between nutritional status and food preferences by residence (r = 0.67 for rural and r = 0.94 for urban sites). A statistically significant (P < 0.10) difference was also observed in BMI between them. **Conclusion:** This small study identified the connection between food preferences, location choices and their nutritional outcomes. Food-away home leads to obesity and pose threats to nutrition security.

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Positive Role of CSO in Facilitating the Ten Steps for Successful Breastfeeding Implementation: Health Care Workers Perspective

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Keywords: Ten steps · Successful breastfeeding · Barriers · Facilitators

Background/Aims: Despite the presence of national policy support, the prevalence of early breastfeeding initiation in Indonesia are still low. Research has shown that Health care workers (HCWs) are the most reliable source for breastfeeding advice, but sadly they were often lacking in capacity. In this paper, we reflected on the role of Civil Society Organization (CSO) in facilitating the implementation of Ten Steps for Successful Breastfeeding (TSSB) trough continuous training aimed at health care workers in Malang and Sidoarjo districts, East Java Province. **Methods:** The study applied an interpretive, qualitative approach exploring the health care workers' perspective on the role of the CSO in facilitating the Implementation of TSSB in East Java. In this study the PARiHS framework was used to identify the role of CSO in facilitating TSSB implementation from the health workers' perspective. **Results:** Based on HCWs responses, the evidence (E) on breastfeeding and TSSB elements (step 3 to 9) implementation was categorized as strong. Overall the Context (C) of TSSB implementation was considered varied in which the highest contextual barriers experienced by private hospital while community health center with government owned hospital was in between. Facilitation implemented by the CSO was considered appropriate due to its ability to address some pressing obstacles (knowledge, skill, cost) and provide not only training to improve evidence but also help in addressing other contextual barriers. **Conclusion:** The CSO has offered opportunities not only for dissemination of evidence based intervention but also to close gaps on resources provision to attend courses.

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A Multivariate Analysis of Predictors Contributing to Wasting and Stunting among Children Under Five Years along the Thailand-Myanmar Border

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Keywords: Children · Under five years · Stunting · Wasting · Thailand-Myanmar border

Background/Aims: Wasting and stunting remain a public health challenge among refugee children along the Thailand-Myanmar border, but information on their determinant factors is lacking. Therefore, the purpose of this article was to identify predictors related to wasting and stunting among children aged 6 to 59 months. **Methods:** Using a cross-sectional study design, the biennial nutrition survey was conducted in nine refugee camps in 2017, with a total number of 2,702 children included in these analyses. The multivariate logistic regression was employed to figure out predictors related to wasting and stunting. The Odds Ratio (OR) with a 95% Confidence Interval (CI) was used to show the strength of the relationship, and variables with a p-value of <0.05 were considered as statistically significant. **Results:** The percentage of wasting and stunting were 2.1 and 28.8, respectively. Low birth weight (OR = 4.8, 95% CI 2.6–8.7) and uneducated mother (OR = 2.0, 95% CI 1.1–3.4) were dominant factors of wasting, while low birth weight (OR = 3.7, 95% CI 2.8–5.0) and large household size (OR = 1.3, 95% CI 1.1–1.6) were important predictors of stunting. Moreover, age 6 to 59 months tended to be related to stunting (OR = 1.0, 95% CI 1.0–1.0). **Conclusion:** The prevalence of childhood wasting was below an acceptable level, but stunting was moderate. Thus, it is crucial to strengthen nutrition interventions based on the predictors, especially child's birth weight and maternal education.

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Relationship between Fast Food Consumption Habits, Nutritional Status and Stress Levels on Adolescent Menstrual Regularity at SMK 32 Jakarta in 2018

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Keywords: Menstrual order · Fast food consumption habits · Stress levels

Background/Aims: Menstruation is a physiological change that is affected by reproductive hormones and characterized by bleeding from the uterus with the release of uterine mucous membranes that occur periodically and cyclic (monthly) or commonly called the menstrual cycle. The regularity of the teenage menstrual cycle is influenced by several factors, including fast food con-

sumption habits, nutritional status and stress levels. The purpose of the study was to determine the relationship between fast food consumption habits, nutritional status and the level of stress on menstrual regularity at SMK 32 Jakarta. **Methods:** This research was a quantitative study with cross sectional study design. Data collection was conducted on January 26, 2018 with a total sample of 206 female students of SMK 32 Jakarta. Data analysis was performed using univariate and bivariate analysis with Chi square statistical test. **Results:** The proportion of regular menstruation in female students of SMK 32 Jakarta was 21.4 percent. The results showed a significant relationship between habit of fast food consumption (p value = 0.0013) with odds ratio (OR) 2.444 (95% CI = 1.193- 5.007) and menstrual regularity in students of SMKN 32 Jakarta. **Conclusion:** Reducing consumption of fast food may help improving regularity of menstrual cycle.

Impact of Nutrition Interventions for Reduction of Maternal Anemia in Low and Middle Income Countries – An Evidence Summary

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Keywords: Evidence summary · Maternal anemia · Low and middle income
Bcakground/Aims: Anemia remains a major public health problem affecting 468.4 million women of reproductive age (WRA) in low and middle-income countries (LMICs), despite numerous existing maternal nutrition programs. The objective of the evidence summary (ES) was to summarize the findings from the selected Systematic Reviews (SRs) on the effectiveness of the nutrition interventions (nutrition specific and nutrition sensitive) implemented in LMICs for reducing the prevalence of anemia in WRA. **Methods:** Comprehensive electronic search was performed on international and regional databases (n = 21) focusing on public health, nutrition, health and social sciences. Only SRs published in English language and between January 2000 to June 2016 were considered for further process. Standardized tool AMSTAR was used for methodological quality appraisal. A priori inclusion and exclusion criteria and double-blinded screening with the reconciliation process were conducted by the third investigator. **Results:** Total of 16 SRs were included for final synthesis and examined the impact of various nutrition interventions contributing to the reduction of anemia in WRA. Overall, intermittent iron supplementation (6 SRs), vitamin A/carotenoid supplementation (1 SR) and multiple micronutrient fortification (3 SRs) were significantly associated with the reduction in maternal anemia. No impact of multiple micronutrient supplementation (4 SRs), folic acid supplementation (1SR), and calcium supplementation (1 SR) were observed to reduce maternal anemia. **Conclusion:** The interventions of various forms of iron, vitamin A or carotenoid supplementation/fortification showed a positive impact on reducing anemia in WRA.

Antenatal Depression: Prevalence and Its Associated Factors among Overweight/Obese Pregnant Women Residing in North-West Delhi

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Keywords: Depression · Overweight · Pregnancy · Prevalence
Background/Aims: India is facing dual burden of under nutrition and escalating rise in overweight and obesity problem. An increase has been observed among overweight/obese women of reproductive age (15–49 years) from 26.4% (National Family Health Survey, NFHS-3, 2005–06) to 34.9% (NFHS-4, 2015–16) residing in Delhi. A maternal state of both obesity and depression can lead to adverse obstetric outcomes. The aim of study was to evaluate the prevalence of depression and its associated factors among overweight/obese women attending antenatal clinic at North-West Delhi. **Methods:** A cross-sectional observational study was conducted among 40 overweight/obese pregnant women with gestational age of <20th week. Edinburgh Postnatal Depression Scale (EPDS) was used for detecting Antenatal Depression (AD). Additional socio-demographic and obstetric history was recorded and analyzed using SPSS version 25. Descriptive statistics such as mean, standard deviation and frequencies were used. **Results:** The mean score for EPDS was 13. Out of total participants 55% had depressive symptoms (EPDS >12). Of the participants, 17.5% have answered that sometimes they had thought of harming themselves. Risk factors associated with AD were current pregnancy complications (59%), child care responsibility (18.2%), lack of support from family (9.1%), poor obstetric history (4.5%), fear of first pregnancy (4.5%) and occupational workload (4.5%). **Conclusion:** High prevalence rate of AD in current study highlights that maternal mental well-being is of major concern. Future implication is required to develop strategies for timely recognition and appropriate intervention for AD along with weight management among overweight/obese pregnant women in order to improve obstetric outcome.

Multi-Nutrient Biscuits and Psychosocial Parenting Education Increases Height and Development of Toddlers

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Keywords: Development · Height · Multi-nutrient biscuit · Psychosocial parenting · Toddlers
Background/Aims: Poor nutritional status or stunting still becomes a public health problem in Indonesia, with prevalence of 37.2% in 2013. Some research results show that stunting children have lower cognitive development than normal children. This

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study aims to identify whether there is an effect of giving multi-nutrient biscuits and psychosocial parenting education on height and development of children under the age of three (toddlers). **Methods:** This study used quasi experimental design. The treatment was given for 2 months to 28 stunting children who were divided into 3 groups, namely: (1) multi-nutrient biscuits (2) psychosocial parenting education (3) multi-nutrient biscuits and psychosocial parenting education. In order to identify the effect of treatment on children's height and development, the data obtained was analyzed using paired t-test, while the analysis of differences between treatment groups was carried out using analysis of variance (ANOVA). **Results:** The results showed that giving psychosocial parenting education significantly increased height, children's nutritional status based on height by age index, and improved cognitive development among toddlers. Giving multi-nutrient biscuits and psychosocial parenting education significantly increased height and cognitive development among toddlers. **Conclusion:** In order to overcome children's growth and development problem, nutrition interventions need to be carried out along with the provision of education about maternal parenting to children.

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Analysis of Food Service System and Quality of Lunch Menu in Primary Schools

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Keywords: Food service · Quality menu · Children in primary school

Background/Aims: School feeding program (SFP) has been identified to provide several benefits for primary students. SFP may increase academic achievement, improve nutritional status, school attendance and improve nutritional intake among primary students. To date, it remains unknown the difference of SFP system and quality of lunch menu in primary school using different models. Thus, the aim of this study was to analyze different SFP systems and quality of lunch menu in primary school using inside and outside model. **Methods:** This study was done by cross-sectional design in two different primary school (Al Muslim and Al Hidayah primary schools) that use different models of SFP. **Results:** We found that food service model and quality of lunch menu (nutrients, food variety and standard servings) in Al Muslim primary school was significantly different and better than Al Hidayah primary school. The adequacy of nutrients particularly protein, calcium and iron in Al Hidayah students was significantly better than Al Muslim student (p-value <0.05). However, the prevalence of overweight and obesity was higher in Al Hidayah (54.85%) school than Al Muslim school (39.5%). **Conclusion:** Primary school need to collaborate with nutritionist to plan the menu and food service system to achieve optimal nutritional status.

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Comparison of Socio-Economic Status and Macronutrient Intake between Household with and without Double Burden of Malnutrition

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Keywords: Double burden of malnutrition · Overweight · Socioeconomic · Stunting

Background/Aims: Double burden malnutrition (DBM) is prevalent in developing countries, including Indonesia due to nutrition transition. This study aimed to compare socio-economic status and macronutrient intake between households with and without double burden of malnutrition. **Methods:** This was cross-sectional study involving 428 mothers proportionally chosen from 16 Integrated health post (*Posyandu*) in Surabaya, East Java Province, Indonesia. Each household were categorized into two groups based on mother's body mass index (BMI) and child's height-for-age z-score (HAZ); households without DBM and household with DBM. DBM was defined as coexistence between overweight/obese mother and stunted children in one household. Macronutrient intake was obtained using repeated 24 hr food recall and socio-economic status was measured using structured questionnaire. Data on socio economic status were: mother's educational level, mother's occupation, household income, and food expenditure. **Results:** The prevalence of household with double burden of malnutrition was 27.5%; while 12.4% children were stunted and 45.6% mothers were overweight/obese. Logistic regression analysis showed that there was significant different in mother's education level (p = 0.001; OR = 0.672; 95% CI = 0.531–0.852), mother's occupation (p = 0.042; OR = 0.632; 95% CI = 0.380–1.051), protein intake of the children (p = 0.022; OR = 0.971; 95% CI = 0.947–0.996), and fat intake of the mother (p = 0.000; OR = 1.000; 95% CI = 0.978–1.002) between households with and without double burden of malnutrition. **Conclusion:** It is imperative to improve mother's knowledge related to adequate protein and fat intake to reduce the risk of double burden of malnutrition.

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A Three-Pronged Enforcement Model to Achieve Universal Salt Iodization and Ensure Its Sustainability in Indonesia

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Keywords: Monitoring · Salt · Central Java · Women volunteers

Background/Aims: Iodine deficiency is among the most easily preventable causes of mental impairment. An ideal vehicle to ensure that iodine reaches the population, is through salt due to its unmatched distribution platform with a uniform uptake amongst all income groups. Strong Universal Salt Iodization (USI) programs require well designed comprehensive legislation, a salt industry capable of meeting required standards, effective

enforcement and monitoring, and a government committed to enforcing legislation. Nutrition International (NI) supports Government of Indonesia to sustain USI by establishing a three-pronged enforcement model: (i) overall national enforcement; (ii) provincial and district level Team GAKI (IDDTeam); (iii) village level monitoring. Successful enforcement requires enforcement options, budget allocations, accountability and consumer awareness. National enforcement is by FDA (BPOM), at province level Local Police Administration as part of local GAKI Team GAKI monitor salt. At consumer level, some villages in Central Java have Team GAKI comprising of Head of Village, Secretary of Village, PKK volunteers, Village Police. Key strategies employed by Local police administration is confiscation of un-iodized or inadequately iodized salt and discarding it into the water, while women volunteers at village level use minilabs to test salt samples collected from village kiosks. This three pronged approach is an effective strategy to ensure salt processors adequately iodize salt, wholesalers ensure salt purchased is adequately iodized and address consumers' demand for adequately iodized salt. **Conclusion:** Guaranteeing all components of a USI program run effectively and in tandem, will help in sustaining universal salt iodization and reaching the last mile.

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Potential of Bouillon Cubes, Seasonings and Condiments to Deliver Essential Micronutrients: A Systematic Review and Scenario Analyses for Asia

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Keywords: Micronutrients · Seasonings · Condiments · Fortification
Background/Aims: Despite improvements in micronutrient status in Asian countries over the last decades, 21–47% of women are still suffering from anemia, and in most Asian countries pregnant women have an inadequate iodine status. Cooking aids, such as bouillon cubes, seasonings and condiments (fish and soy sauce) are increasingly recognized as suitable vehicles for micronutrient fortification. **Methods:** We performed a systematic review to evaluate consumption patterns of cooking aids in Asian countries. The outcomes were used to perform a scenario analysis of fortifying these food vehicles with iodine and iron on micronutrient intake. **Results:** Data from 13 studies in 6 Asian countries were included. Mean intake (range) of bouillon cubes, seasonings and stocks was 4.0 (0.5–6.2) g/d. Consumption of condiments was 8.7 (2.3–15.9) g/d. Scenario analyses showed that use of iodized salt (at local regulated levels) in bouillon cubes and seasonings can increase iodine intake with 60 (7–93) μg/d and with 50 (9–119) μg/d when condiments would contain iodine. In a second scenario analyses, foods were fortified with iron at levels of 1 mg/g for bouillon cubes and seasonings and with 0.575 mg/mL for condiments. This resulted in an improvement of iron intake of 4.0 (1.9–6.2) mg/d for bouillon cubes and seasonings, and 5.0 (1.3–9.1) mg/d for condiments. **Conclusion:** Bouillon cubes, seasonings and condiments are widely consumed in Asian countries, and

fortification with iron and iodized salt can help to increase the intake of iron and iodine with approximately 33% of the RDA on average.

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Assessment of Nutrition Status and Physical Activity towards Sarcopenia among Independently Living Elderly in Pangkalpinang City

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Keywords: Nutrition status · Physical activity · Sarcopenia · Independently living elderly
Background/Aims: The study in 2016 found out that the prevalence of sarcopenia among elderly in Indonesia was considerably high (40.6%). Sarcopenia was influenced by nutritional status and physical activity. Obesity sarcopenia become a double burden on the elderly who were less physically activity, as it increased the risk of insulin resistance, dyslipidemia, heart disease, and other metabolic diseases. **Methods:** This study used quantitative observational with cross sectional design. The subject of this study involved 132 independently living elderly (60–69 years) in Girimaya Subdistrict, which was selected through purposive sampling. Data collection was conducted by measuring muscle mass using bioelectrical impedance analysis (BIA); muscle strength used hand grip strength (HGS); and the gait speed for 6 minutes. Data analysis was performed by Pearson and Spearman correlation test (p < 0.05), and multiple linear regression. **Results:** Most subjects (50.7%) were identified as obese. Sarcopenia had not occurred in the subject (based on muscle mass index), although there was a decrease in muscle strength (29.5%) and gait speed (71.2%). Nutritional status was positively correlated with muscle mass index (p = 0.000). Walking activity was positively correlated with muscle mass index (p = 0.000), muscle strength (p = 0.000), and gait speed (p = 0.000). Daily physical activity was positively correlated with gait speed (p = 0.002). Meanwhile, sedentary activity was negatively correlated with muscle strength (p = 0.009) and gait speed (p = 0.000). **Conclusion:** Walking activity was the strongly correlated with muscle mass index, muscle strength, and gait speed.

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Analysis of Dietary Intake Status in Young Japanese Adults by Lipid Energy Ratio Stratification

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Keywords: Lipid energy ratio · Young Japanese adults · Dietary intake · Visceral fat
Background/Aims: The aim of this study was to identify issues with dietary intake causing lifestyle-related diseases in young adults, examine and present appropriate methods of analysis to identify such issues, and obtain suggestions for effective lifestyle-

related disease prevention measures for implementation during early adulthood. **Methods:** Self-administered surveys on physical status (age, body mass index, and waist circumference) and dietary intake status were distributed to 273 young adult males and 352 middle-aged adult males. With middle-aged adult males as the target group, subjects consisted of young adult man were divided into five groups ranging from low to high value by fat energy ratio in the food content. Each group was then analyzed for nutrient intake and degree of obesity, waist circumference. **Results:** Among the young adult males, 135 had a high-fat diet and the higher the lipid energy ratio, the greater was the total energy and waist circumference. The group with a ratio exceeding 40% was found to have dietary patterns of lower grain intake and higher meat, oil, fat, and soft drink intake than those of other groups. The high-fat diet group among young adult males with a lipid energy ratio exceeding 40% had significantly greater waist circumferences than other groups despite being young adults, suggesting that their high-fat diet was the factor responsible for the accumulation of visceral fat. **Conclusion:** The analysis by stratification of lipid energy ratio attempted in this study allowed the identification of issues related to dietary intake in young adults.

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Food Skills Level of Students in a Selected University in Indonesia

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Keywords: Food skill · Young adult · Healthy consumption
Background/Aims: The increasing prevalence of non-communicable diseases is attributable to the unhealthy consumption. One's healthy consumption can be achieved by someone's ability to acquire knowledge in preparing food and implement it on a daily basis. Food skill is a term used to describe someone's skills in providing and preparing safe and nutritious food suitable for family and people around. Some studies mentioned that the ability to prepare and cook food is decreasing globally. This study aimed to assess the food skills level in Indonesia's population, especially in young adults. **Methods:** This study was conducted in October-November 2018 in students of a selected university in Indonesia using cross-sectional study design with 301 samples involved. **Results:** The study showed that 45.2% of the students were categorized as having lower food skills. **Conclusion:** Lower food skills lead to unhealthy consumption behavior. Improvement of food skills is needed to raise the awareness and practice of healthy consumption behavior to bring a better degree of public health in Indonesia. It can be implemented starting from primary schools, which will hugely affect the food skills ability in adulthood.

1004

Deep Fried Snack Consumption more than One Times/Day Increased Body Fat Composition on Office Workers

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Keywords: Deep fried snack · Body fat · Visceral fat · Office worker
Background/Aims: Street food becomes inseparable part of Indonesian diet, especially deep fried snacks. Unfortunately, despite its delicious taste, high frequency of deep fried snack consumption can impact on obesity risk. This study aimed to analyze the relationship between deep fried snack consumption and body fat composition on office workers using cross sectional design. **Methods:** Subjects were office workers in University of Muhammadiyah Jakarta (n = 112) taken by purposive sampling. Body fat composition was measured by using Bio Impedance Analysis and the semi-quantitative FFQ was used to collect food consumption data. Chi Square was used to examine the association between consumption and body fat, independent t-test was used to test differences between genders. **Results:** The results showed that 52.7% subjects frequently consumed fried snack (>1 time/day), while 47.3% rarely consumed it (1–2 times/week). There was a positive relationship between the age of subject with percentage of body fat (P = 0.005; OR: 7.04) and visceral fat (P = 0.004; OR:3.12). Nutritional status was significantly related to percentage of body fat (P = 0.003; OR:4.96) and visceral fat (P = 0,000; OR:13.54). The frequency of deep fried snack consumption has a positive relationship with percentage of body fat (P = 0.008; OR = 5.16), nor of visceral fat (P > 0.05). The results of the independent sample t-test showed that body fat and visceral composition, nutritional status, and frequency of deep fried snack consumption were not significantly different (P > 0.05) between men and women. **Conclusion:** This research represents that deep fried snack consumption more than one times/day was related to body fat composition.

1005

Toybox Study Malaysia: A Qualitative Study on Snacking and Drinking Habits among Kindergarten Teachers in Klang Valley, Malaysia

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Keywords: Snacking · Drinking · Behavior · Kindergartens
Background/Aims: Continuous snacking and over-consumption of sweetened drinks have been linked to increased rates of obesity in children. Thus, it is important to instill healthy eating behavior from a young age. This study aimed to explore snacking and drinking habits of kindergarten teachers. **Methods:** Two focus

group discussion (FGD) sessions were conducted with fourteen teachers of selected kindergartens in Kuala Lumpur and Selangor. The sessions were facilitated by a trained moderator using a semi-structured interview guide and were audio-recorded, and notes were taken by a rapporteur. The data were transcribed verbatim, coded and analyzed by at least two researchers and verified by senior team members. **Results:** Majority of teachers occasionally consumed snack food with the children and these foods were often served during morning break time at the kindergartens. The teachers were aware that sweetened drinks are not good for health, and of the benefits of drinking plenty of water. Most teachers drink plain water, but some prefer to drink sweetened or flavored drinks at tea time. Plain water consumption ranged between 500 ml to 3 L daily, and plain water was usually brought from home. **Conclusion:** The findings showed that teachers have good snacking and drinking habits, and could become good role models to the children in kindergarten.

1006

Correlation of Food Habit and Physical Activity with Nutritional Status among Adolescents Aged 13–17 Years Old in Java Island Indonesia: Result from Global School-Based Student Health Survey 2015

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Keywords: Physical activity · Food habit · Adolescent · Nutritional status
Background/Aims: Adolescent nutritional status determines quality of human resource in the future. This study analyzed the correlation of food habit and physical activity with nutritional status among adolescents in Java Island Indonesia. **Methods:** The study used secondary data from Global School-Based Student Health Survey 2015 involving 2,699 junior and senior high school students. The data on subject characteristics, food habits, physical activity and nutritional status were collected through self-reported questionnaires. **Results:** Almost three-quarter of subject (73.0%) had normal nutritional status, around one-fifth (21.3%) were overweight and around one-tenth (11%) were stunting. Female subjects were significantly found more in normal nutritional status than male subjects. There were differences in consumption of vegetables, fast food, soft drinks, breakfast habits, frequency of physical activity, and duration of sedentary activities between male and female subjects ($p < 0.05$). There was a negative correlation between age and consumption of fruit, fast food and breakfast habit ($p < 0.05$). Age was also correlated positively with frequency of walking or cycling, attendance in Physical Education (PE) and duration of sedentary activities ($p < 0.05$). Breakfast habits was correlated positively with nutritional status (BAZ), meanwhile attendance in PE was correlated negatively with nutritional status (BAZ) ($p < 0.05$). Age was correlated positively with nutritional status (HAZ), while frequency of fruit consumption was correlated negatively with nutritional status (HAZ) ($p < 0.05$). **Conclusion:** There is a need to increase awareness on healthy eating and lifestyle in Java Island, and need to compare the figure with the situation outside Java Island in order to develop more comprehensive policy.

1007

Exclusive Breastfeeding is a Significant Factor Associated with Post-Partum Weight Loss among Lactating Mothers in Depok City

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Keywords: Exclusive breastfeeding · Post-partum · Weight retention · Weight loss
Background/Aims: Weight retention during post-partum period is generally not preferred by mothers. Mothers are known to reduce energy intake during lactation in order to lose weight, despite the additional energy requirement during lactation for breast milk production. This study aimed at investigating factors that influence post-partum weight loss. **Methods:** Data from a prospective cohort quasi-experiment study conducted in Beji, Depok were used. This study recruited lactating mothers from community health centers and they were followed up from delivery to six-months post-partum. A total of 201 breastfeeding mothers determined by cohort sample size formula were included. The dependent variable was six months' post-partum weight loss, while the independent variables were age, energy intake, education, working status, parity and exclusive breastfeeding practice. Analysis was conducted using independent t-test and multiple linear regression. **Results:** The study found that mean age of the mothers was 30.3 years old (95% CI: 29.8–31.1 years old). Majority of the mothers had senior high school education, were not working, multiparous and practicing exclusive breastfeeding. Mean intake of energy was 1,946 kcal/day (1,897–1,994 kcal/day). Mothers experienced mean weight loss of 3.79 kg during the study period (3.27–4.31 kg). Post-partum weight loss was associated with exclusive breastfeeding ($p = 0.004$), and education status of the mothers ($p = 0.029$). **Conclusion:** Exclusive breastfeeding for six months is the dominant factor associated with post-partum weight loss of the mother. Breastfeeding mothers should be supported on their intention to exclusively breastfeed and not to be unduly concerned with gaining weight.

1008

Tackling Obesity through Sugar Sweetened Beverage (SSB) Tax in South East Asia – Collating and Visualizing the Data

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Keywords: Soda tax · Sugar sweetened beverages · Asia · Obesity
Background/Aims: Sugar Sweetened Beverages (SSBs) include soda, fruit drinks, 3-in-1-mixes, cordials, energy or sports drinks that contain sugar. Excess SSB consumption is associated with obesity prevalence, especially among children. Food taxes influence

purchase decisions, improve food quality and generate revenue to fund health initiatives. Therefore, SSB tax has gained momentum globally as an obesity prevention strategy by reducing intake of empty calories. As countries in the Southeast Asian region have recently implemented or are considering SSB tax to tackle their growing prevalence of obesity, we examined the existing evidence for the efficacy of SSB tax. Despite closely shared values and geographical proximity, SE Asia is diverse in terms of its per-capita GDP, lifestyle and obesity prevalence. Similarly sugar and SSB consumption, contribution of soda to sugar intakes, existing soda pricing, SSB taxation levels and coverage proposed also vary in this region. For e.g. while Brunei and Malaysia have high obesity rates and SSB consumption, soda is a major source of sugar in Philippines and Vietnam albeit with moderate rates of obesity. Using data visualization techniques, we systematically examine these indices to evaluate how SSB tax would affect purchasing behavior and health in the region that shares commonality as well as diversity. Evidence suggests country and population-specific variations in the effectiveness of SSB tax. Several factors determine the efficacy of SSB tax: obesity prevalence, SSB intake levels, base SSB price, level of taxation and products covered by the tax. Health promotion efforts that may work in tandem with taxation efforts are discussed.

1009

Relationship of Macro Nutrient Intake, Frequency of Fast Food Consumption, Physical Activity and the Amount of Pocket Money with Obesity among Students at SMPN 9 Palembang

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Keywords: Obesity · Macro nutrient intake · Frequency of fast food · Physical activity · Pocket money

Background/Aims: This research aimed to know the relationship between macro nutrient intake, frequency of fast food, physical activity and the amount of pocket money with obesity among Junior High School students in Palembang. **Methods:** This case control study was done in October-December 2018 with study population was students at SMPN 9 Palembang aged 13–15 years. There were 322 respondents participated in the study. The statistical test used was Test Chi Square. **Results:** There were meaningful relationship between protein intake (p-value 0.038, OR = 3.455), fat intake (p-value 0.007, OR = 5.231, carbohydrate intake (p-value 0.017, OR = 4.297, the frequency of fast food (p-value 0.038, OR = 3.455), physical activity (p-value 0.009, OR = 4.750) with obesity. However, there was no relationship between the number of pocket money with obesity (p-value 0.192). **Conclusion:** Weight monitoring among students is important to prevent and reduce the obesity.

1010

Nutrition Situation Analysis for Multi-Sectoral Decision Making – Examples from the Fill the Nutrient-Gap (FNG) Analysis in Asia

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Keywords: Fill the nutrient gap · Nutrition-specific · Nutrition-sensitive · Situation analysis · Affordability

Background/Aims: The Fill the Nutrient Gap (FNG) situation analysis for decision making identifies context-specific barriers and entry-points for food, health and social protection systems to improve nutrition through increasing availability, access, affordability and choice of healthy, safe, nutritious foods. It is applied across the spectrum of malnutrition and has been designed to contribute to national policy (re)design, in particular of nutrition and social protection, and program planning cycles. The analysis combines review and analysis of secondary information on food and nutrition with Cost of the Diet analyses and modeling to assess affordability of a nutritious diet and possible improvements thereof. Stakeholders from multiple sectors are involved. Based on the results, they identify which nutrition-specific and nutrition-sensitive interventions to prioritize in order for consumer to have more choices, e.g. ensuring nutritious foods are available, physically accessible and affordable, and to stimulate making good choices. Between 2016–2018, FNG analyses have been conducted in six countries in Asia (Pakistan, Cambodia, Laos, Sri Lanka, Philippines, Indonesia) and five more are getting started (Myanmar, Timor Leste, Bangladesh, Nepal, Afghanistan). In several countries, the FNG has been able to reframe the discussion on causes and approaches to addressing malnutrition as having to include a shift of the focus across the food system and on increasing nutrition-sensitivity of social protection mechanisms. The latter can include better targeting, including of specific subgroups, adding nutrition-specific interventions such as fortified infant cereal and social behavior change communication, and evaluating transfer value relative to the cost of a nutritious diet.

1011

Consumers' Raw Poultry Handling Behavior in Preventing Cross-Contamination

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Keywords: Raw poultry handling behaviour, cross-contamination, consumer behaviour

Background/Aims: Poultry can be easily contaminated by risky infectious microorganisms, originating from the poultry slaughtering, processing, storage, handling and preparation stages. The lack of preventive behavior of consumers will lead to a food borne illness commonly implicates a discomfort of the gastrointestinal tract, abdominal pain, diarrhea, and sometimes vomiting. The aim of this research was to study about the consumers' raw poultry handling behavior in preventing the risk of cross-contam-

ination. **Methods:** A cross-sectional study was conducted to determine the consumers' raw poultry handling behavior in preventing the risk of cross-contamination at Tesco Supermarket, Section 13, Shah Alam, Selangor, Malaysia. Primary data was collected using self-administered questionnaire. A random sampling method has been used whereby 125 consumers were selected to answer the questionnaires. Data were analyzed using descriptive statistics and chi-square analysis. **Results:** The result also indicated that consumers have a strong level of cross-contamination preventive behavior in most analyses. However, consumers have slightest actions on placement of poultry in which the result shows the lowest percentage. Besides, the results also indicated there were no significant relationship between meat section, raw poultry handling and poultry storage on level of consumers' cross- contamination behaviors. **Conclusion:** Education on hygiene and food safety should be continuously given by the authorized bodies to keep consumers understand the risk of cross contamination. Authorized bodies should enlighten the precise poultry placement as consumers have lack knowledge on it.

1012

Effectiveness of a School-Based, Peer-Led Intervention Program on the Adolescents' Body Composition, Eating Behaviors and Health-Related Quality of Life

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Keywords: EPaL intervention · Adolescents · School-based · Peer-led
Background/Aims: The prevalence of overweight and obesity, as well as disordered eating continue to increase dramatically and have become major public health concerns. The 'Eat Right, Be Positive About Your Body and Live Actively' (EPaL) Program is a school-based, peer-led health education intervention program which aimed to promote healthy lifestyle in preventing overweight and disordered eating among secondary school adolescents. This study aimed to determine the effectiveness of the EPaL program on body composition, eating behaviors and health-related quality of life (HRQOL) among a sample of Malaysian secondary school adolescents in Selangor state. **Methods:** Out of 201 adolescents participated in the study, 76 adolescents (Intervention group, IG: n = 34; Comparison group, CG: n = 42) aged 13–14 were included in the final analysis. All anthropometric measurements were measured by trained researchers, while the adolescents completed a set of questionnaire. All measurements were taken at three-time points [pre-intervention (Pre), after the intervention (Post-I) and 3-month follow-up (Post-II)]. **Results:** Although there were insignificant changes in BMI z-score, IG reported significantly lower body weight (adjusted mean difference = –1.63 kg; 95% CI = –2.99, –0.26; p = 0.020) at Post-I, and lower uncontrolled eating at Post-II (adjusted mean difference = –2.48; 95% CI = –4.65, –0.32; p = 0.025) compared to CG. While there were insignificant changes in overall HRQOL, the IG reported significantly higher emotional functioning at Post-II (adjusted mean difference = 10.98; 95% CI =

1.07, 20.89; p = 0.030) as compared to CG. **Conclusion:** The EPaL program contribute to the improvement in the adolescents' body weight, uncontrolled eating and emotional functioning. This study added to the knowledge and evidence on the effectiveness of health interventions in Malaysia.

1013

Mitigating Unhealthy Food Consumption: The Effect of Parental Mediation on Indonesian Children's Snack and "Western" Fast Food Consumption

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Keywords: Children · Indonesia · Snack · Fast food · Parental mediation
Background/Aims: Snacking is prevalent among Indonesian children, yet, many school snack foods are of low nutritional value, predisposing them to poor nutritional status. Similarly, fast foods tend to have high energy density, low fiber and micronutrients, making consumers susceptible to weight gain and obesity. Parental guidance is critical to help children navigate the unhealthy food retail environment. This study aimed to examine how parents, through parental mediation, can mitigate children's unhealthy food consumption, whether active mediation (AM; parents frequently explain and discuss the importance and reason for healthy eating) or restrictive mediation (RM; parents set rules on what, how much, and when to eat) is more effective. **Methods:** Survey data were collected from grade-three-and-four children and their mothers (final n = 394). Measures comprise children's snack spending as proxy for snack consumption, "Western" fast food consumption (portions of French fries, burger, and fried chicken consumed weekly), mother's AM and RM, and demographic profiles. **Results:** Regression analysis on snack food spending revealed that higher levels of AM were linked to lower snack spending, while RM had an opposite effect. Male and older children tended to spend more on snack foods. The regression results for "Western" fast food consumption showed that higher levels of AM were related to lesser "Western" fast food consumption, but RM did not register any effect. Children whose mothers had tertiary education consumed less "Western" fast food. **Conclusion:** To mitigate children's unhealthy food consumption, it is not enough for parents to exert control by setting rules. Rather, they need to discuss and explain the reasons behind the importance of healthy eating to their children.

1014

Vitamin B12 Status in Hong Kong Middle Aged and Older Adults Living in the Community

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Keywords: Vitamin B12 deficiency · Supplementation
Background/Aims: Low vitamin B12 status is associated with various health outcomes including neurological and hematological conditions. This study examined the effect of fortified milk supplementation as part of lifestyle intervention program on vitamin B12 status of community-dwelling Hong Kong adults aged 50 and above. **Methods:** One hundred and eighty subjects were randomized into intervention or control group. The intervention group received two servings of milk daily in addition to their usual diet and was engaged in an exercise program twice per week for 24 weeks. The control group maintained their usual dietary habits and physical activities. Serum vitamin B12 was measured at baseline, 12 and 24 weeks using chemiluminescent immunoassay. **Results:** The groups had adequate vitamin B12 status at baseline but serum vitamin B12 level increased significantly from baseline to 24 weeks in the intervention group while it did not change significantly in the control group. Mean vitamin B12 level (pmol/l) was 345.3 + 118.9 at baseline and 483.5 + 136.1 at 24 weeks for the intervention group whereas the corresponding values were 342.6 + 140.1 and 357.1 + 134.4 for the control group (ptime*group <0.001). Percentage of subjects with subclinical vitamin B12 deficiency (<200 pmol/l) in the intervention group decreased from 11.4% at baseline to 2.7% at 12 weeks and 2.9% at 24 weeks while in the control group, it was 13.4% at baseline and decreased to 7.7% at 12 weeks and 6.8% at 24 weeks. **Conclusion:** The lifestyle intervention including fortified milk supplementation was effective in improving vitamin B12 status.

1015

Energy Balance and Nutritional Status of Students of Cirebon Nutritional Diploma Study Program, Tasikmalaya Health Polytechnic, Indonesia

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Keywords: Energy activity · Energy balance · Energy consumption · Nutritional status
Background/Aims: Nutritional problems arise because of malnutrition due to an imbalance between energy consumption and energy expenditure. This study aimed to analyze the relationship of energy balance with adolescent nutritional status. **Methods:** Observational research with a cross-sectional study design using a sample of students majoring in nutrition from Tasikmalaya Health Polytechnic (n = 32) was conducted. Statistical analysis used the Spearman correlation test. **Results:** The average energy consumption of the sample was 1,497 kcal. The average consumption level of energy was 63.9% of the RDA and most of the samples were categorized as very poor (65.6%). The average of energy expenditure of the sample was 2,317 kcal, higher than the average energy consumption of 1,497 kcal. Based on energy consumption and energy expenditure, most of the samples (93.8%) had a negative energy balance. The nutritional status of most samples was normal (68.8%). There was a significant (p = 0.001 <0.05; r = −0.558) relationship between energy balance and nutritional status, which means that the higher energy balance value means the lower Z-Score value (Body Mass Index by Age, BMI/A). **Conclusion:** The energy balance was associated with nutritional status of university students.

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Age, Nutritional Status, and Body Weight of Toddler as Predictors for Toddlers' Food Portion Size Estimation by Mothers

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Keywords: Age · Nutritional status · Weight · Portion · Toddler
Background/Aims: About one-third of mothers feel do not know or feel less confident about the appropriate portion to meet their toddler's nutritional needs. The maternal practice of feeding strategy influences the development of toddler's feeding regulation. The energy adequacy of toddlers in Yogyakarta is partly less than 100% requirement. This study analyzed the determinations of toddler's portion size estimation by mother. **Methods:** This cross-sectional study involved 82 mother-toddler participants from 5 locally integrated health posts (*Posyandu*) in the Yogyakarta city. The mother's portion size estimation was explored with a scaled food pictures questionnaire by food groups. Toddler's age, body weight, and height/length were collected from *Posyandu*'s assessment. **Results:** Most of the mother tend to over-estimate carbohydrate sources, under-estimate animal protein sources, under-estimate plant protein sources, over-estimate vegetables, and under-estimate fruits intake. The proportion of underweight among toddler was 16%, stunting was 32%, and wasting 9%. There was a significant relationship between toddler's age and portion size estimation of whole food groups, specifically in carbohydrate, plant protein, vegetables, and fruits. There was a significant relationship between toddler's body weight and portion size estimation of whole food groups, specifically in plant protein and vegetable. There was no significant relationship between nutritional status and portion size estimation. Mother's perception on portion size estimation for toddlers was determined by the toddler's age and body weight. **Conclusion:** Further studies are needed to explore the knowledge and practices of appropriate portion size for toddler regarding their feeding practices.

1017

The Differences between Emotional Eating in Normal Weight, Thin and Overweight Adolescents in Yogyakarta, Indonesia

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Keywords: Emotional eating · Nutritional Status · Adolescence

Background/Aims: Emotional eating has been shown to be associated with negative emotions that commonly affect eating behavior. Negative emotions are thought to be associated with higher intake of fat and sugar. Individual having such an unhealthy behavior may gain their weight which lead to obesity. In adolescence increased sensitivity level called "storm and stress" are expected and we need to know the differences between emotional eating in normal weight, thin and overweight adolescents. **Methods:** In cross-sectional design, emotional eating and nutritional status were observed. All data were collected from 770 students of the senior high school in Yogyakarta. Nutritional status was measured using BMI-for-Age, emotional eating was measured using Emotional Eating Scale for Children and Adolescents (EES-C). The EES-C were divided into 3 subscales: EES-C for Unstable emotion (EES-UNS), EES-C for Depression Emotion (EES-DEP), and EES-C for Happy emotion (EES-Happy). Mann-Whitney test was used in the analysis. **Results:** Of the subjects, 4.9% of the adolescent were thin, 76% were normal and 19.1% were overweight. The study found significant differences in emotional eating of EES-UNS subscale based on nutritional status categories among girls ($p = 0.033$), EES-DEP based on the nutritional status categories of boys ($p = 0.015$) and EES-Happy based on nutritional status categories both in boys and girls ($p = 0.017$; $p = 0.049$). **Conclusion:** Emotional eating was not only influenced by nutritional status, but also gender. Therefore, we recommend an after school program (e.g. sports and theater) activities to divert negative emotional changes in adolescence.

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Analysis of Factors Affecting IYCF Counseling Performance of *Posyandu* Cadres in Bogor West Java

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Keywords: Cadres · Performace · Motivation · Knowledge · Attitudes

Background/Aims: The objective of this study was to analyze the factors that influence the performance of Infant and Young Child Feeding (IYCF) counseling of *Posyandu* cadres. **Methods:** The research design used was cross sectional. The sample set were 55 cadres from 2 villages in Ciomas Bogor Subdistrict with the criteria of working as a cadre for at least 2 years, minimum education in junior high school and active cadres. Cadre characteristic data consisted of name, age, education, cadre work, number of family members, length of time being a cadre and ever or no training was collected using a structured questionnaire. Cadre knowledge data was obtained by giving questionnaires containing questions with 4 answer choices. Data on attitudes, motivation and performance were obtained by giving questionnaires and measured using a 5-point Likert scale. **Results:** The results of the validity and reliability of the questionnaire showed reliable. To analyze the hypothesis of the influence of characteristics, knowledge, attitudes, motivation on performance (Y) in the cadre group, the data was processed using structural equation modeling (SEM) with the method of partial least square (PLS) estimation. The results showed that the exogenous latent variables that influence the performance of IYCF counseling in *Posyandu* cadres were education, had received training and length of time being a cadre and motivation. It has not been proven that there was a significant effect of knowledge and attitudes towards the performance of IYCF counseling. **Conclusion:** Continuous training and motivation are important to improve cadres' performance on IYCF counseling.

1019

Local Regulation as a Nutritional Improvement Solution: A Case Study of Moringa Program in West Sumbawa

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Keywords: Moringa · Local food · Nutrition · Regulation

Background/Aims: The monitoring of the nutritional status in 2017 showed that the percentage of underweight in West Sumbawa was 20.8% – higher than national figure (17.8%). In 2016, *Pencerah Nusantara*, a program that strengthen primary health care through youth empowerment and inter-professional collaboration, encouraged the use of moringa as local food ingredient to improve the nutritional status of children at Poto Tano Health Center, West Sumbawa District. Moringa Program is an innovation program to educate community about nutrition and provide moringa-based foods for improving nutrition of the community. This program was then developed not only at one health center but in all sub-districts. Furthermore, *Bappeda* (Local Development Planning Agency) included moringa program to Local Nutrition Action Plans as stipulated in the District Regulation No. 80/2017 about preservation of moringa. This study aimed to identify the influencing factors and the impact of moringa program. **Methods:** The study used a case study design on community readiness assessment and complemented by secondary data collection. **Results:** The study shows clearly that the regulation is key factor in strengthening cross-sector partnership and maximize efforts in improving community nutrition through the Moringa Program. During the implementation of providing moringa-based foods as a provision of supplementary feeding and complementary feeding at integrat-

ed health posts (*Posyandu*), there was a decreasing case of under-weight in children under five at Pototano Health Center from 21.8% in 2017 to 2.8% in 2018.

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Association of ADRB2 rs1042713 with Obesity and Obesity-Related Phenotypes and Its Interaction with Dietary Fat in Modulating Glycemic Indices in Malaysian Adults

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Keywords: ADRB2 rs1042713 · Obesity-related traits · Dietary fats · Malaysian adults

Background/Aims: Individual variations in phenotypic traits result not only from genetic variations, but may also manifest in response to individual diet. Our study aimed to evaluate i) the association of ADRB2 rs1042713 with obesity and obesity-related metabolic parameters, and ii) the effect of dietary nutrients on these associations in Malaysian adults. **Methods:** ADRB2 genotyping, dietary, physical activity, anthropometric and biochemical data was collected from 79 obese and 99 non-obese individuals. **Results:** No association between rs1042713 and obesity (p = 0.725). However, the G allele carriers (AG+GG) of rs1042713 were associated with increased odds of insulin resistance, 2.83 (CI = 1.04–7.70, p = 0.042), in the dominant model. Obese individuals carrying the G allele were associated with higher total cholesterol (p = 0.011), LDL-cholesterol levels (p = 0.008), total cholesterol/HDL-cholesterol (p = 0.048), compared to the non-carriers (AA). Such differences were not observed in the non-obese participants. Irrespective of obesity, GG genotype carriers had significantly lower fasting glucose levels with low saturated fatty acid intake (<7.3% of TE/day) (p = 0.011) and high intake of polyunsaturated fatty acid/saturated fatty acid ratio (≥0.8/day) (p = 0.006). The latter had significantly lower HOMA-IR (p = 0.026) and fasting insulin levels (p = 0.036) with high polyunsaturated fatty acid intake (≥6% of TE/day). **Conclusion:** G allele carriers of ADRB2 rs1042713 were associated with increased odds of insulin resistance. Obese individuals carrying G allele were compromised with higher blood lipid levels. Replacing isocaloric quantity of foods rich in saturated fatty acid with polyunsaturated fatty acid may improve homeostatic control of blood glucose and enhance insulin sensitivity in individuals carrying the G allele of rs1042713.

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Relationship between Consumption of Iron Enhancer and Inhibitor Foods, and Behavior Related to Anemia with Anemia Status in Undergraduate Students of Nutritional Science Study Program (NSS), Bogor Agricultural University (IPB)

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Keywords: Anemia · Behavior related to anemia · Iron enhancer · Inhibitor foods consumption · Hemoglobin level

Background/Aims: The prevalence of anemia was 18.4% in the age group of 15–24 years in Indonesia. Iron deficiency anemia in students can be caused by lack of iron intake and behavior related to anemia. The objective of this study was to analyze the relationship between consumption of iron enhancer and inhibitor foods, as well as behavior related to anemia with anemia status. **Methods:** The design of this study was cross-sectional which involved 230 undergraduate students of NSSP-IPB. Food consumption data were obtained from Food Frequency Questionnaire. Knowledge, attitude, and practice related to anemia was acquired through questionnaires, and anemia status was obtained by checking hemoglobin levels using the HemoCue method. **Results:** The highest consumption of iron enhancer foods was chicken (4.72 times/week), while the lowest was fruit product such as juice (0.25 times/weeks). The knowledge and attitude related to anemia were categories as sufficient, while the practice was less. There was a relationship between iron enhancer and inhibitor foods consumption with hemoglobin level (p < 0.05), while there was no relationship between knowledge, attitudes, and practices related to anemia with anemia status. **Conclusion:** Consumption of iron enhancers and inhibitor foods affect anemia status among university students.

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Ferritin Level of Pregnant Women with Hypothyroidism in Iodine Deficiency Disorders Endemic areas

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Keywords: Chronic energy deficiency · Ferritin · Hypothyroidism · Pregnant women

Background/Aims: Several minerals are needed for thyroid hormone to work properly, such as iodine and iron. Iron is one of important essential trace elements that serves as co-factor for thyroid peroxidase (TPO). Those with iron deficiency have lower ferritin serum level than those who are normal. In particular, pregnant women with chronic energy deficiency (CED) have higher anemia risk than the otherwise. The study aimed to measure ferritin level and CED of hypothyroidism pregnant women living in iodine deficiency disorders (IDD) endemic areas. **Methods:** Cross-sectional design was applied in the study on 37 pregnant women

(aged 18–45 years old, 2–8 months pregnant) living in IDD endemic of Dayakan and Watu Bonang Villages of Ponorogo District. Observation involved measurement of upper arm circumference (UAC) and enzyme-linked immunosorbent assay (ELISA) analysis of thyroid stimulating hormone (TSH) level, free thyroxine (fT4), and ferritin. **Results:** Among pregnant women, 27% had hypothyroidism and 54.05% had ferritin deficiency, with 30% had both conditions. The hypothyroidism was higher in pregnant women had CED than those non-CED, 50% vs. 18.5%. No significant correlation (p≥0.05) between hypothyroidism and both ferritin and CED, but adjusted odds ratio (AOR) was found at 4.4 (95% CI: 0.91–21.24), indicated more than four times higher risk of hypothyroidism in pregnant women with CED than the otherwise. Hypothyroidism in pregnant women living in Ponorogo was not caused by iron deficiency, but allegedly by lack of other nutritional intake. **Conclusion:** Integrated and sustainable efforts to improve nutritional status is needed since pre-conception and throughout pregnancy.

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Knowledge of Nutrition and Iron Pills Consumption are Associated with Anemia among Adolescent Girls in Kampar, Riau

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Keywords: Adolescent girls · Anemia · Iron pills · Knowledge of nutrition

Background/Aims: The prevalence of anemia is high in Indonesia. Iron pills supplementation program was given to adolescent girls to address this problem. The study objective was to determine the proportion of anemia and factors that associated with anemia in adolescent girls in high school/vocational school in Kampar, Riau. **Methods:** The study design was cross sectional. The number of samples was 156 adolescent girls. Knowledge of nutrition was categorized as low and high. Iron pills consumption was categorized as not consuming and consuming. Iron pills that adolescent girls consumed were from iron supplementation program that given by community health service. Data analysis used multiple logistic regression. **Results:** The results showed that the proportion of anemia in adolescent girls was 62.8%. Girls with low of knowledge of nutrition had risk being anemia than girls with high of knowledge of nutrition (OR = 11.8; 95% CI = 4.15–33.71). Girls did not consume iron pills had risk being anemia than girls consumed iron pills (OR = 5.7; 95% CI = 1.96–16.42). **Conclusion:** Knowledge of nutrition and iron pills consumption was associated with anemia among adolescent girls. It is recommended that iron pills supplementation program is accompanied by nutrition education.

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Iron and Ascorbic Acid Intake, Hemoglobin Level, Menstrual Pattern and Linear Growth among Female Adolescents in Lamongan City, Indonesia: A Cross Sectional Study

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Keywords: Stunting · Iron intake · Hemoglobin · Menstrual pattern · Female adolescent

Background/Aims: Recent study showed adolescent is another golden period in human's life cycle where the second period of growth spurt peak occurs. In the same time, female adolescents also experience menstruation which implicates to the raise of iron requirement. This study was aimed to assess the correlation between iron intake, hemoglobin level, menstrual pattern, and stunting among female adolescents. **Methods:** A cross sectional study design was used in this research involving 213 female students who randomly selected from Public Senior High School in Lamongan City, East Java, Indonesia. The respondents were aged between 15–18 years old and did not have any medical condition related to anemia. Pearson correlation and multiple linear regression were used to assess association between height for age z-score (HAZ) and independent variables. **Results:** Bivariate statistical analysis showed that hemoglobin level (R = 0.157; p = 0.13), menarche period (R = –0.151; p = 0.016), severity of bleeding (R = –0.136; p = 0.027), and iron intake (R = 0.178; p = 0.006) were significantly correlated with HAZ of the respondents. On the other hand, ascorbic acid intake and duration of menstruation did not express meaningful correlation (in accordance, p = 0.181; p = 0.218) Moreover, multivariate analysis indicated that iron and vitamin C intake, hemoglobin level, and menstrual pattern gave significant influence to HAZ among female adolescents (p = 0.003). **Conclusion:** To reiterate, female adolescent need to improve iron and vitamin C intake, especially when they suffer heavy bleeding or longer duration of menstruation in order to give sufficient nutrient to either prevent or overcome stunting.

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A Geospatial Analysis of Fast Food Outlets and Association with Eating Behavior and Body Weight Status among Malaysian Adolescents

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Keywords: GIS · Food environment · Adolescents

Background/Aims: Neighborhood food environment may be related to obesity among adolescents and potentially related to obesity-related health disparities. Greater access to fast food outlets has been associated with less favorable diet quality and an increased prevalence of obesity. The purpose of this study was to investigate spatial relationship between various food environment features with weight status and eating behaviors among adolescents. **Methods:** A total of 995 adolescents were recruited and completed a questionnaire on eating behavior and sociodemographic information, with height and weight measured. Geographic Information System were used to geocode for spatial cluster analysis with 400 and 800-m-radius buffer around each school. We examined the relationship between the presence of fast food outlets with fruit and vegetables and fast food intake and BMI using multivariate models. **Results:** The findings revealed that the median distance from any school in urban area to the nearest fast food outlet was 0.52 km and 67% of schools had at least one fast food outlet within 800 m. Weight status were positively associated with the presence of fast food outlets within a 1.6 km buffer. Spatial analysis showed no significant difference in food environment features and weight status among adolescents. The further away the fast food outlets was associated with higher consumption in fruit and vegetables. **Conclusion:** Intervention and policies that improve adolescent's access to healthy food in the neighborhood areas and that mitigate the concentration of fast food outlets close to schools may be key to promoting healthy eating habits among adolescents.

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Investigation and Comparison of Nutrients Supplements Use, Knowledge and Attitudes in International and Chinese Students of Southeast University in China

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Keywords: Nutrients supplements · International students · Knowledge · Attitudes

Background/Aims: The purpose of this study was to investigate and compare the nutrients supplements use, knowledge and attitudes among Southeast University students (Chinese and International), and to analyze the relationship between personal use on nutrients supplements of both Chinese and International student's demographics. **Methods:** A cross-sectional study was conducted during September 2017 to March 2018 in Southeast University, China. A structured, self-administered, questionnaire was employed for this study. The data, extracted from the questionnaires, entered into Epidata, were analyzed using the IBM SPSS Statistics version20. **Results:** The total number of international students was 500 and the Chinese students was 976. The age bracket 18–24 years old had the largest percentage in both Chinese and International students, and there were slightly more males than females in the study, 58% and 69.6% respectively. Around 58% of international students have taken supplement in the past 12 months while around 77% of Chinese students haven't taken them. The most commonly-used nutrient supplements were vitamin A, vitamin C in both gender categories and in both study groups. There was a statistically difference on the students' opinions on knowledge related questions in the two study groups such whether it's necessary to take supplementation (p = 0.02), overconsumption leading to toxic side effects (p = 0.03), whether they can encourage the neighboring environment to take them (p = 0.03). **Conclusion:** The differences seem on supplements use can be explained by socio-cultural differences such as background, culture and the different lifestyles developed throughout life.

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The Impact of Anemia on Motoric Development in Under Two Years Children: A Cross Sectional Study in Aceh Besar District, Indonesia

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Keywords: Anemia · Motoric development · Hemoglobin · Children

Background/Aims: Anemia and iron deficiency can cause detrimental effects on brain development, and continued iron deficiency anemia is known to interfere with development which results in a permanent delay in mental and motoric development. This study was aimed at knowing the impact of anemia status on gross and fine motoric development in children aged 12–24 months. **Methods:** A cross-sectional study design was applied to 102 under-two year children selected using stratified random sampling technique with proportional allocation. Children's characteristics, socioeconomic status of the family, were measured by interview using a structured questionnaire, hemoglobin was measured by Hemocue 201+ tool, and motor development of children was measured using the Denver II instrument. **Results:** Almost two-thirds (68.6%) of children suffer from anemia, and 34.3% experiencing the delay in motor development. The prevalence of children with fine and gross motoric development delay was higher in children with anemia (27.1% and 17.1%) than non-anemia, respectively (3.2% and 9.4%). The correlation test results showed that anemia status was significantly associated with fine motoric development (r = 0.291; p = 0.003), while not significant to gross

motoric development (r = 0.092; p = 0.357). **Conclusion:** The prevalence of anemia in children 12–24 months old was very high, and has an impact on motor development delays, so anemia prevention programs and motoric stimulation intervention for under two years' children are needed.

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Iodine Status and Thyroid Function of Childbearing Age Women (CBAW) in Three Areas with Different Iodine State Levels

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Keywords: UIE · TSH · FreeT4

Background/Aims: Iodine deficiency affects people of all age groups and yields detrimental health effects known as Iodine Deficiency Disorders (IDD). Universal Salt Iodization (USI) where above 90% household use iodized salt became the main program to optimized community iodine status. This study aimed to analyze iodine status and thyroid functions from three different IDD endemic regions. **Methods:** This was a cross-sectional study conducted in Yogyakarta city, Bukit Tinggi city, and Purworejo regency. Subjects of this research were CBAW (15 to 45 years old), 250 in each region. Urinary iodine (UIE), TSH, FreeT4 levels and the presence or absence of iodine in salts were assessed. **Results:** Households using iodized salt were 95.97% in Yogyakarta city, 93.07% in Purworejo regency, and 93% in Bukittinggi. Furthermore, in Yogyakarta, median UIE was 218 µg/ml. Average TSH (2.16 µIU/mL) and FreeT4 (1.2 ng/dl) were at normal level. In Purworejo, median UIE were 224 µg/ml. Average TSH (1.78 µIU/ml) and FreeT4 (1.33 ng/dl) were at normal thyroid function. Bukit Tinggi showed median UIE level 88 µg/ml (UIE <100 µg/ml was 32.2%, UIE <50 µg/ml was 24.9%). Average TSH (2, 25 µIU/ml) and FreeT4 (1.22 ng/dl) and the majority of thyroid function was normal. **Conclusion:** All three regions have achieved USI target, with normal thyroid function at average. Iodine status in Yogyakarta and Purworejo were above the average. Meanwhile, in Bukit Tinggi IDD is still considered as public health problem with mild iodine deficiency state. Further data need to analyze the adequacy of iodine in salt.

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United for Healthier Kids II (U4HK-II) a Multicomponent Nutrition Education Program Improve Nutrients Consumed among Preschool Children

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Keywords: Nutrition education tools · Preschool food consumption · School-based education tools

Background/Aims: Establishing healthy eating habits should be implemented in preschool children since dietary habits are developed during the first five years of life. After a successful of the United for Healthier Kids – I (U4HK-I) program, U4HK – II, a multicomponent nutrition education program was developed. This study aimed to investigate the effectiveness of U4HK-II on the quality and quantity of lunch consumed in children ages 3–5 years old in 6 schools in Thailand. **Methods:** U4HK-II comprised 4 educational tools including 1) Hero plate, a portion control plate 2) Hero board, a sticker board for rewarding 3) Hero contents, the nutrition knowledge and 4) Hero menus, modified nutritious menu was developed. Child psychiatrists, registered dietitians, professional chefs, and graphic designers modified the program in order to correct U4HK-I limitations including, foods availability, possibility of the budget and short duration of the implementation. After 7-month program implementation, food intake was assessed with the weighted plate wasted method during the 3 consecutive day pre- and post-intervention. **Results:** 715 students enrolled in the study (379 girls 336 boys, mean age 4.14 ± 0.76 yr). Energy, carbohydrate, protein and fat intake were closely matched the Thai dietary reference intakes (DRI). In addition, vegetables and fruit consumption were brought closer to the recommended amount. U4HK-II has a potential benefit to improve nutrients consumption in preschool children. **Conclusion:** Collaboration of multidisciplinary professionals has a significant benefit to the program. However, program should collaborate with families or care-taker in order to promote children's healthy eating throughout the day.

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Energy Transition in the Southeast Asian Countries: A Joinpoint Regression Analysis of Food Balance Sheet Data from 1961 to 2013

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Keywords: Energy transition · Food balance sheet · Joinpoint regression analysis

Background/Aims: The present study aimed to analyze the temporal trends in the availability of energy intake in the Southeast Asian (SEA) countries diet from 1961 to 2013. To avoid inter-country variations and errors, this study used dataset derived from the FAO's food balance sheets. **Methods:** We used joinpoint regression analysis for the temporal trends. The annual percentage change (APC) was computed for each segment of the trends. **Results:** Availability of energy has increased in the SEA by 47.9% during the last 53 years with an average annual percent change (AAPC) of 0.8. Energy availability in the diet differed almost 1.7 times in the SEA countries in the 1960s, with the highest in Malaysia and the lowest in Myanmar. During the period 1961–2013, the energy availability increased among all the countries in different rates, highest in Myanmar (AAPC = 1.0) and lowest in Laos (AAPC = 0.4), Timor-Leste (AAPC = 0.4), and Malaysia (AAPC = 0.4). We had extracted 3 to 4 energy transition trends among the countries of the SEA with very diverse annual percent changes. During the 1960s and 1970s, the availability of energy increased in all the SEA countries except Myanmar (APC= –0.41) and Vietnam (APC= –0.25). During the 1990s all the SEA countries had experienced a marked increase in the availability of energy, especially Thailand, Myanmar, Vietnam and Indonesia. The availability of energy in the SEA countries increased by 47.9% from 1961 to 2013. **Conclusion:** During the 1990s, the SEA countries had experienced a marked increase in the availability of energy in the diet.

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Micronutrient Adequacy and Food Source of Micronutrients Among Indonesian Women Aged 19–49 Years

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Keywords: Adult women · Food consumption · Micronutrient intake · Nutritional adequacies

Background/Aims: The objective of this study was to analyze micronutrient adequacy and food sources of those micronutrients by Indonesian women aged 19–49 years old. **Methods:** This research was conducted by analyzing secondary data of Total Diet Study of the Ministry of Health of Indonesia 2014, obtained through a 24-h food recall method. Total number of adult women aged 19–49 years of these data after applying inclusive and exclusive criteria was 31,746 from all provinces of Indonesia. The micronutrients analyzed include vitamin A, vitamin C, calcium, iron and zinc. The nutrient requirement from Institute of Medicine were used as benchmark. **Results:** The results showed that the adequacy of vitamin A, vitamin C, calcium, iron and zinc were less than two-third (65%) of its requirement. The five largest food contributors for vitamin A was chicken eggs, palm oil, carrots, water spinach, and chicken. While for vitamin C was cassava leaves, long bean, tomatoes, orange and papaya. The five largest food contributors for calcium intake were rice, tofu, mixed-soybean tempeh, unsalted anchovy, and pure-soybean tempeh. Rice, spinach, tofu, chicken eggs, and wheat flour were the five largest contributors for iron intake. Rice, mackerel tuna, wheat flour, soybean tempeh, and chicken meat were the five foods contributed greatly to zinc. **Conclusion:** This implies that the Indonesian woman diet need to be improved, especially by increasing the intake of animal foods, fruit and vegetables, which are rich in micronutrients.

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Impact of A School Nutrition Program (SNP) in Malaysia

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Keywords: Primary school children · School Nutrition Program · Eating behaviors · Cognitive performance

Background/Aims: Malaysian primary school children are at risk of poor dietary behaviors and low physical activity that may affect their nutritional status and cognitive performance. Therefore, a Healthy Lifestyle Program (HLP) that integrated both nutrition education and school food environment is developed to improve nutrition knowledge and attitude among intervention respondents, and facilitate them the environment to practice healthy eating habits. The present study evaluated the impact of HLP in eating behaviors, physical activity, body mass index-for-age and cognitive performance before and after program between intervention and comparison groups. **Methods:** This quasi-experimental study recruited 523 primary school children (aged 7–11 years) from six randomly selected schools in Batu Pahat District, Johor, Malaysia. All respondents were required to complete anthropometric measurements, Eating Behaviors Questionnaires (EBQ), and Physical Activity Questionnaire for Children (PAQ-C), while cognitive performance was assessed using Raven's Colored Progressive Matrices during pre-intervention, post-intervention and 3-month follow-up. Linear Mixed Model analysis was performed to determine the impact of HLP after adjusted for covariates (child's age, sex, parental education level and school type). **Results:** The intervention group showed more frequent consumption of breakfast, lunch, dinner and morning tea, higher frequency of physical activity and better cognitive performance as compared to comparison group overtime, after adjusting for covariates (p <

0.05). At 3-month follow-up, intervention group reported lower BAZ than their comparison counterparts (p < 0.05). **Conclusion:** The HLP shows positive impacts on eating behaviors, physical activity and cognitive performance of Batu Pahat children. Hence, the HLP is highly recommended to extend to all Malaysia primary schools.

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Food Systems Approach to Improve Diet and Nutritional Outcomes: Integration of Three Studies Conducted in Rural Communities in Sri Lanka

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Keywords: Food systems · School meal · Nutrition education · Homegarden · Nutrient profiling

Background/Aims: Food system involves all the elements and activities that relate to the production, processing, distribution, preparation and consumption of food, and the outputs of these activities. **Methods:** Three different studies were conducted to investigate and analyze how food production systems contribute and influence people's dietary intake and nutritional outcomes. **Results:** In Study 1, meals prepared using menus containing locally available foods were provided to school children in a rural school along with comprehensive food and nutrition education program for 10 months. At the end of the intervention, school children showed an improvement of dietary intake compared with baseline. Meals contributed >20% in macronutrients and energy, and >25% of micronutrients in the actual daily intake of children. In Study 2, a rural community was encouraged to have organized home gardens (OHG) and their dietary intakes were compared with households with non-organized home gardens (NOHG). The families with OHG consumed significantly higher amount of calcium, iron, vitamin C and vitamin A and achieved greater dietary diversity compared with households with NOHG. In Study 3, Healthiness Index for 58 snacks prepared using local foods was evaluated using nutrient profiling models. Ranking of healthiness of foods showed that most of the snacks available in the food outlets were 'less healthy' and not suitable for regular consumption. All three studies interlinked the importance of informed food choices for the people. **Conclusion:** The studies collectively suggest changes in consumer behavior can open pathways to more sustainable food systems that enhance food security and nutrition.

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Safety and Nutrition Quality in School Canteen: Study Case in Malang

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Keywords: Nutritional quality · School meal · Canteen

Background/Aims: Stunting and anemia are prevalent among school-aged children in Indonesia. Foods sold in school canteen contribute to the quality of food intake of school children. However, study on food quality sold in school canteen is limited. The study aimed to assess the nutritional quality and safety of foods sold in high school canteens. **Methods:** The study was a cross-sectional design. Food samples were collected from 26 participated junior and senior high schools in Malang City. Nutrients content of foods were calculated using NutriSurvey® software. The food samples were analyzed for the presence of formalin, borax, and rhodamine B. Assessment of hygiene and sanitation implementation was carried out using a checklist. **Results:** The number of foods sold in 26 school canteen which met daily energy requirement and protein of students was 40.0% and 36.2% respectively. Vegetables were used in a small amount. Overall hygiene and sanitation score was 73.9%. However, there was an exception to sanitation facilities at a certain establishment which could explain microbial contamination occurred. Formalin, borax, and rhodamine B were found in 42.31%, 29.3%, and 5.38% of food samples respectively. **Conclusion:** The food sold in the school canteen was still not in accordance with the needs of school children and there was still food contaminated with chemical and microbiological hazards. Monitoring of nutritional values, chemical and microbiological hazards are needed for foods sold in the school canteens.

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The Effectiveness of Nutrition Education, Counseling and Exercise on Desirable Dietary Pattern Score and Weight Loss in Obese Teenagers

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Keywords: Teenager · Overweight · Obese · Nutrition counseling

Background/Aims: The prevalence of overweight among teenagers in Jakarta city reached 9.4% and obese 5.7% which can affect the increasing of non-communicable diseases. The aim of the study was to access the effectiveness of nutrition education (NE), nutrition counseling (NC), nutrition counseling and exercise (NCE) compare to control group (CG) on changing in desirable dietary pattern (DDP) and weight loss in overweight and obese teenagers at Jakarta. **Methods:** The subjects were 120 students of

High School 80 Jakarta who met the criteria of inclusion (with z-score BMI for Age score above 1) and exclusion. The design was Randomized Controlled Trial, 4 groups (@ 30 subjects). Interventions were given for 2 months. Data were obtained through interviews, filling out questionnaires, anthropometric measurements (weight and height) and food recall 1x24 hours before and after the intervention. **Results:** Wilcoxon test (α = 0.05) showed significant changing in DDP score in NE (pNE = 0.012) and NC (pNC = 0.000); and weight loss in all three intervention groups (pNE = 0.018; pNC = 0.003; pNCE = 0.004). Compare to Control Group (Mann-Whitney test, α = 0.05), NC intervention was the most effective in changing DDP scores (p = 0.000) and weight loss (p = 0.000). **Conclusion:** Nutrition counseling is the most effective intervention; it can be continued through peer counseling model among high school students to prevent obesity in adolescents

Body Self-Perception and Its Relation to Breakfast Habit among Adolescent Girls in Sub-Urban Area East Java

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Keywords: Adolescent girls · Breakfast · Body perception
Background/Aims: Adolescent is an important period of growth spurt and during this stage healthy eating pattern and physical activity behavior should be established. There are many factors affecting eating pattern among adolescent girls. Perception on body weight among adolescent girls become an important issue since it is related to eating pattern. Skipping breakfast is common practice among adolescent because of their perception related body weight concern. The objective of this research was to analyze the association of body self-perception and breakfast habit among adolescent girls in sub-urban area. **Methods:** A cross sectional study was conducted on August-October 2016 in Sidoarjo East Java that represent an sub-urban area. The sample was selected by stratified random sampling. The sample was 105 adolescent girls who completed home visit interview. The characteristics of adolescent girls, body self-perception and breakfast habit were assessed by structured questionnaire. Spearman test was employed to analyze the data. **Results:** Among adolescent girls, seventy-six percent of the adolescents perceived they did not have ideal body image with the majority of body self-perception were being thin (41.0%) and being overweight (39.0%). Forty-two percent of adolescent girls did not have regular breakfast habit. There was association of body self-perception and breakfast habit (p = 0.003). **Conclusion:** The girls who perceived her body as overweight was more likely to skip the breakfast.

Patterns and Determinants of Household Level Double Burden of Malnutrition in South and Southeast Asia

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Keywords: Double burden of malnutrition · Mother-child double burden · Malnutrition · South and Southeast Asia
Background/Aims: Many developing countries now face the household level double burden of malnutrition, defined as the co-existence of overweight or obese mother and at least one of her under five children was undernourished within the same household. **Methods:** We used population representative cross-sectional data from the Demographic and Health survey (DHS), conducted between 2006 and 2016, for eight South and Southeast Asian countries: Bangladesh, India, Nepal, Pakistan, Myanmar, Timor, Maldives, and Cambodia. Multinominal logistic regression was performed to identify the socio-demographic factors associated with the double burden of malnutrition. A total 878,366 households were included in this study. **Results:** The pooled prevalence of overweight or obese mother and stunted child (OWOBM/STC) was 10.0% (95% CI: 8.0–11.0), overweight or obese mother and wasted child (OWOBM/WSC) was 6.0% (95% CI: 5.0–7.0), overweight or obese mother and underweight child (OWOBM/UWC) was 6.0% (95% CI: 4.0–7.0). The coexistence of overweight or obese mother and underweight or stunted or wasted child (OWOBM/USWC) was observed 11.0% (95% CI: 9.0–13.0) in households. The presence of OWOBM/STC, OWOBM/WSC, OWOBM/UWC and OWOBM_USWC showed statistically significant positive association (p < 0.05) with mother's age 40–49 years, richest household, maternal education, more than four household members. In addition, household level double burden of malnutrition was higher in children of mothers those had primary or below primary education and lives in richer household. **Conclusion:** It's high time to introduce household level malnutrition prevention program to tackle this problem.

Status of Breastfeeding at Birth and at 6 Months Amongst Mothers Residing in Urban Delhi-NCR

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Keywords: Breastfeeding · Breastmilk · Complementary feeding
Background/Aims: NFHS-4 (2015–16) reported that in India only 41.6% of the infants are breastfed within one hour of the birth and 45.1% of the infants are not exclusively breastfed for first 6 months. The present study aimed to assess the breastfeeding practices of mothers at birth and at 6 months in urban Delhi-NCR. **Methods:** A total of 185 mother-infant (6 months) dyads attend-

ing Pediatric OPD of a Govt. hospital and a private clinic were selected purposively. A questionnaire was developed to record the participants' information on breastfeeding practices. **Results:** Only 29.7% of the infants were breastfed within one hour of the birth inspite of 97.3% institutional deliveries. It was reported that 40.5% of the infants received feeds other than breastmilk, mainly infant formula (81.3%) at the place of birth. Pre-lacteals were given to 13% of the infants mainly as a traditional practice. Exclusive breastfeeding for six months was reported amongst only 62.2% of infants. Top-feeding/complementary feeding was documented amongst 71.9% of the infants, of which only 45.1% infants received complementary foods at an appropriate age of 6 months. **Conclusion:** The status of breastfeeding practices in India still remains poor even after decades of work done to promote and protect breastfeeding. Further institutional care and support for breastfeeding at the time of birth and counseling regarding appropriate feeding of the infant is required to strengthen breastfeeding in India.

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Indonesian Parents Risk and Benefit Perception of The Current School Food Environment on The Avoidance to Children School Food Consumption

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Keywords: School food environment · Perceived risk and benefit · Risk management · School age children nutrition
Background/Aims: School food environment held high influence on children nutritional supply and habit formation; however in Indonesia the environment has not shown optimal condition and the case is different among type of schools. The purpose of this study is to measure parents' risk and benefit perception influence on the avoidance to school food environment under the influence of food risk knowledge and trust to food sellers. **Methods:** Data were collected at September 2018 using online questionnaire with 355 Public School subjects and 219 Private School subjects. The measurement items were developed from literature review and were validated using exploratory and confirmatory factor analysis. The hypotheses analysis with structural equation modeling showed that risk perception was positively influenced by food risk knowledge and negatively influenced by trust to food seller in Public School parents, but only negatively influenced by trust to food seller in Private School parents. **Results:** Nutritional benefit perception was positively influenced by trust to food seller in both group of parents, accessibility benefit perception however was negatively influenced by trust to food seller in Public School parents. The avoidance to school food environment in both group of parents were positively influenced by risk perception and negatively influenced by nutritional benefit perception. **Conclusion:** The results proved that parents showed avoidance to children's consumption from school food environment and an immediate risk management intervention is needed. The risk management intervention should reduce the risk in the current school food environment and optimize the nutritional benefit from the food consumed by the children.

1040

BMI as a Dominant Factor of Uric Acid Level among Satuan Polisi Pamong Praja in Working Area of East Jakarta

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Keywords: Uric acid level · Body Mass Index · Civil Service Police Unit (Satpol PP) officer
Background/Aims: The changes of body metabolism can increase uric acid level. The increase of uric acid level for men in some countries have a fairly large prevalance ranging about 30–35%. The increase of uric acid level for a long time can induce damage in joint, kidney, and soft tissue. The aim of this study is to analyze the dominant factor which is determining uric acid level among male officer of Satuan Polisi Pamong Praja in Working Area of East Jakarta. **Methods:** This cross sectional study was conducted on 150 male officer of Satuan Polisi Pamong Praja in Working Area of East Jakarta. The uric acid data was collected in primary by checking the blood uric acid level with Uric Acid Test Family Dr., validity 90%, conducted by medical personnel. At the same time, the nutritional status was collected with anthropometric measurements, food consumption with food recall 3 x 24 hours questionnaire and Food Frequency Quessionnaire (FFQ), also respondents characteristic with characteristic questionnaire. Data was analyzed using multivariat analysis Multiple Linear Regression. **Results:** The result of this study indicated that BMI is the dominant factor determining uric acid level, which is every increase of 1 kg/m^2 then the uric acid level will increase by 0.109 mg/dl after age and protein intake variable controlled. **Conclusion:** Daily exercise highly recommended to do for every Satuan Polisi Pamong Praja Officer as an effort to prevent the risk of obesity.

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Food Security and BMI Status among Adolescents in Kuantan, Pahang

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Keywords: Food security · Obesity · Adolescents
Background/Aims: Food security can be defined as the availability of and accessibility to food, acquired in an acceptable means at any given time and place in a way that could maintain health and wellbeing. This study aimed to identify the food security status and the nutritional status of adolescents and to determine the associated factors. **Methods:** Five hundred and thirty secondary school students from district of Kuantan, Malaysia were measured for their weights and heights. A set of questionnaire containing two sections was used to obtain the sociodemographic data and food

security information. The Radimer/Cornell Instrument (Malay version) was used to capture the severity of food insecurity. **Results:** The findings demonstrated that 23.4% of the respondents were food secure and 76.6% were food insecure, which were categorized into household food insecurity (31.5%), individual food insecurity (7.6%) and child hunger (37.5%). Furthermore, 60% have normal BMI-for-age, 9.2% were underweight, while 16.6% and 14.2% were overweight and obese. The prevalence of stunting was 11.7% while others were categorized as normal in terms of height-for-age z-score. Respondents with working mothers were found to be less likely to experience food insecurity compared to those with mothers who were not working (AOR 0.59; 95% CI: 0.34–0.97; p = 0.037). **Conclusion:** The high prevalence of food insecurity and increasing overweight and obesity incidents are a concern within this area. While food security element should be included in any intervention program addressing overweight and obesity, further research is needed to study the complex relationship between socio-demographic factors, food security and nutritional status.

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Ceria, Respek, Gigih, Aktif, Sihat (C.E.R.G.A.S.): Factors Influencing Sustainability of a School-Based Obesity Intervention for Young Adolescents

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Keywords: In-depth interview · Intervention · Obesity · Sustainability

Background/Aims: School-based obesity intervention is important and when implemented, sustainability should be seriously considered to promote healthy lifestyles and behavior changes in order to overcome childhood obesity. This study aimed to explore factors that promote and inhibit the sustainability of C.E.R.G.A.S. program, which was a 12-week obesity intervention focusing on healthy eating, physical activity and physical fitness. **Methods:** Face-to-face in-depth interviews were conducted at 30 months post-intervention with 21 children who participated in C.E.R.G.A.S. at a secondary school located in Kuala Lumpur. The interviews were audio-recorded, data were transcribed verbatim and analyzed using Nvivo version 12. **Results:** Themes identified as promoting factors were (1) support from family members, researchers, peers and school teachers; (2) self-awareness on mobility, health status, and body image; (3) knowledge on food pyramid and physical activity (4) physical environment; and (5) practices after intervention on physical activity and healthy eating. Barriers were (1) self-attitude, such as laziness, embarrassment, bored, busy, and lack of self-discipline; (2) knowledge consistency; (3) peers influence; (4) social pressure from family members and friends; (5) school and home environment. We found that the main promoting factor of sustainability of C.E.R.G.A.S intervention is support from family members, while the main barrier is self-attitude. Future school-based obesity intervention programs should consider

these factors prior to implementation. **Conclusion:** We opine that C.E.R.G.A.S. obesity intervention program can potentially be adopted and implemented at secondary schools throughout Malaysia to combat obesity.

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Serum Vitamin D and Bone Health Status in Prepubertal Malaysian Children

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Keywords: 25(OH) D, bone mineral density, prepubertal, children

Background/Aims: The association between serum vitamin D and bone health is largely underreported in Asian children. We determined the baseline serum 25(OH)D and bone status of 243 prepubertal Malaysian children aged 9 to 11 years old (Tanner stage 1 and 2) participating in the effects of prebiotic fiber on bone health (PREBONE-Kids) study. **Methods:** Total body bone mineral density (TBBMD) and lumbar spine bone mineral density (LSBMD), bone mineral content (BMC) and body composition were measured by dual-energy X-ray absorptiometry (DXA). Serum 25(OH)D was measured using LC-MS/MS method and compared with the US Institute of Medicine (IOM) cut-offs. Calcium and vitamin D intakes were measured using semi-quantitative food frequency questionnaire. **Results:** The TBBMD and LSBMD Z-scores were normal based on Asian reference data for boys and girls. In contrast, 35% of the children had serum 25(OH)D concentrations indicative of vitamin D deficiency (<30 nmol/l) and only 30.9% had sufficient concentrations (>50 nmol/l). In the vitamin D deficient group, serum 25(OH)D was significantly correlated with TBBMD Z-scores (r = 0.246, p < 0.05) whereas in the vitamin D sufficient group, serum 25(OH)D was positively correlated with vitamin D intake (r = 0.299, p < 0.001). Multiple linear regression analysis, after correcting for multicollinearity, showed that body fat percentage (r2 =0.020, p = 0.016) was the most significant predictor of serum 25(OH)D followed by TBBMD (incremental r2 = 0.026, p = 0.011) and lumbar spine BMC (incremental r2 = 0.036, p = 0.003). **Conclusion:** Our results suggest that serum 25(OH)D may influence BMD accrual and peak bone mass attainment in prepubertal Malaysian children.

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The Relationship between Within-Day Drinking Occasion and Intake Amount of Water among Young Adults in Baoding, China

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Keywords: College students · Daily number of drinking occasion · The amount consumed per drinking occasion

Background/Aims: Water is the major component of the body. Experts recommend drinking 7–8 times a day, about 200 mL each time (Dietary Guidelines for Chinese, 2016). The purpose was to study the within-day drinking occasion and intake amount of water. A cross-sectional study was conducted among 159 young adults aged 18–23 years by simple random sampling in Baoding, China and 156 subjects completed the study. **Methods:** The amount and types of daily drinking water were assessed by 7-day 24-h fluid intake record. **Results:** Adults drank 1,135 mL water every day. The average daily number of drinking occasion was 6 times, adults who drank <6 times, 6–9 times, ≥9 times were 34.6%, 51.3% and 14.1%, respectively. The average amount consumed per drinking occasion was 362 mL, nobody drank <100 mL, 4.5% drank 100–200 mL, 23.7% drank 200–300 mL, 71.8% drank ≥300 mL each time. The daily number of drinking occasion and the amount of water consumed per drinking occasion were different between genders ($P < 0.05$). Adults of lower BMI consumed less plain water per drinking occasion and the amount consumed per drinking occasion increased with the expansion of surface area ($P < 0.05$). The number of drinking occasion of adults was positively correlated with the amount of total drinking occasion, whereas negatively correlated with the amount consumed per drinking occasion ($P < 0.01$). **Conclusion:** Most adults' daily number of drinking occasion and amount consumed per drinking occasion have not reached the recommendations. Drinking a small amount of water many times can increase the total amount and is beneficial for health.

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Formative Research Findings to Inform Targeted Communication Strategy in Promoting School-Based Weekly Iron and Folic Acid Supplementation

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Keywords: Behavior change communication · Iron supplementation · Anemia · Adolescent girl school

Background/Aims: Adherence to WIFAS is still low, thus identification for most appropriate communication channels and evidence-based behavior change intervention strategy is needed. The study aimed to identify target audiences, feasible communication channels, information gaps, aspirations of adolescent girls and their influencers and to develop appropriate content for the targeted communication strategy to improve adherence to WIFAS. **Methods:** Sixteen schools were selected for data collection in four districts in East Java and East Nusa Tenggara province. Data was collected through focus group discussions (FGDs) among female students ages 15 –19 years, male students, teachers and parents resulted in the total of 48 FGDs representing a total of 322 participants. Nvivo 11 software was used for data analysis. **Results:** The main method preferred was still face to face interaction with health workers. Other channel preferred was short videos and pictures accessed through WhatsApp. Anemia was understood as "lack of blood" and perceived to be caused by excessive physical activity, busy schedules and lack of sleep which were reported to cause one to have little energy or time 'to find' healthier food. Adolescent girls did not feel the 'need' to take WIFAS and fear of side effects was also reported to be a deterrent to adherence. Teachers and parents did not perceive WIFAS as preventative intervention and persistently mentioned that screening was needed before deciding whether someone should take the supplement. **Conclusion:** Behavior change intervention strategy should target adolescent girls, teachers and parents, the content should clarify the misconceptions reported by the respondents.

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Inverse Relationship between Dietary Intake and Nutritional Status of Premarital Women in Yogyakarta, Indonesia

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Keywords: Premarital women · Nutritional status · Dietary intake

Background/Aims: Prior to marriage period, concern to body weight among women tends to increase. Some women try to lose weight because they want to look slim and perfect at their wedding. Slim prior to marriage may indicate poor nutritional status and may affects their pregnancy outcomes, especially for those who get pregnant soon after marriage. The aim of this study was to describe the relationship between dietary intake and nutritional status of premarital women in Yogyakarta, Indonesia. **Methods:** This study was an observational study with cross-sectional design. Subjects of this study were 157 women who came to Subdistrict Religious Affairs Office to register their marriage. Anthropometry data were collected by nutritionists, while dietary intakes were measured using Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ). Nutritional status of the participants was classified based on Body Mass Index (BMI). Data were analyzed with Chi-Square test, and ANOVA. **Results:** Of the subjects, 22.9% were underweight and 22.3% were overweight and obese. The average intake of energy, fat and carbohydrate was significantly lower among overweight/obese participants compared to the underweight participants ($p < 0.05$). The relationship between energy, protein and carbohydrate intake with nutritional status were significant ($p < 0.05$). Nutri-

tional status of premarital women will affect their tendency of dietary intake. The overweight/obese premarital women already tend to reduce their dietary intake, and vice versa, because they hope they can achieve their ideal weight before their wedding. **Conclusion:** The increased attention to the weight before wedding should be aware of its effect on their future pregnancies.

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Dietary Calcium Intake and Sources in Chinese Seniors: Findings from The China Nutritional Transition Cohort Study

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Keywords: Calcium · Inadequacy · Food sources
Background/Aims: Calcium plays an important structural role in bones and teeth. However, calcium deficiency is one of the most common nutritional problems in the world and especially in China. The aim of this study was to assess the dietary calcium intake and sources in Chinese seniors. **Methods:** Dietary data were derived from the 2015 China Nutritional Transition Cohort Study by consecutive 3d24hs, collected by means of a tablet device, and household weighing method. The China Food Composition was used to calculate the calcium intake. The percentage of participants whose intake was less than Estimated Average Requirement would be regarded as the calcium inadequacy. **Results:** There were 1,498 (47.6%) males and 1,650 (52.4%) females who were 65 years old and above in this study. The median dietary calcium intake was 310.7 mg/d and the inadequacy was 96.5%. The calcium intake and inadequacy improved significantly with higher education degree, urbanization level, energy intake and milk intake. The inadequacy was 98.0% for those who never consume milk and 83.9% for those who consume more than 200 g milk per day. The main food sources of total calcium intake were vegetables, legumes, cereals and milk which was contributed to 30.4%, 16.7%, 13.5% and 9.7% to total calcium intake respectively. **Conclusion:** The calcium inadequacy was severe in Chinese seniors. It was of great urgency for Chinese seniors to improve the consumption of calcium.

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Sibling Differences in Overweight and Obesity during Childhood and Adolescence in Indonesia: The Role of Mother's Education

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Keywords: Sibling inequalities · Mother's education · Overweight · Obesity
Background/Aims: Besides undernutrition, child overweight and obesity are recent phenomena in countries undergoing the nutrition transition. Overnutrition not only differs across households according to e.g. SES, urban or rural location etc., but that there are also important intra-household inequalities across siblings by gender and birth order (the only child, the eldest, middle, and the youngest). However, the exact nature of such sibling differences in different societal contexts and the extent to which parents can compensate or reinforce such disparities are under-researched. This study analyses to what extent and how chances of overweight and obesity of Indonesian siblings during childhood and adolescence, vary systematically by gender and birth order. Secondly, we look at whether mother's education buffers or aggravates sibling inequalities in overnutrition. **Methods:** We base our analyses on the Indonesian Family Life Survey (IFLS) 2014/2015, which comprises 8,347 children and adolescents (0–19 years of age) born to 4,657 mothers. **Results:** Logistic regressions show that in the Indonesian context, overweight and obesity occurred more often in those who were the only child and the youngest. Rather than reducing disparities, mother's education was more likely to amplify sibling inequalities in overweight and obesity. Children of more educated mothers had a higher probability of being overweight or obese. This applied particularly to boys, the only child, and the eldest. **Conclusion:** Further analyses of food consumption patterns suggested that there should be behavior changes in how mothers, as the traditional primary caregivers, have to supervise their children's and adolescents' diets in sibling-sensitive ways.

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Psychosocial Determinants of Fruit and Vegetable Intake in Teenaged Girls: A School-Based Study

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Keywords: Teenagers · Fruit/vegetable intake · Barriers
Background/Aims: There is limited evidence in Japan regarding the psychosocial determinants of fruit/vegetable (F/V) intake, especially for teenagers. The study aimed to identify psychosocial parameters and the transtheoretical stage of change behavior related to F/V intake among teenagers. **Methods:** We performed a cross-sectional study among female students, aged 12–18 years, in a junior high and high school of Japan. Students who completed the questionnaires (n = 122) were included in the study. Data on demographic characteristics, daily F/V intake, psycho-social parameters related to F/V intake were collected. **Results:** We found only 1.6% of students were aware of the current recommendations for vegetables and 0.8% for fruit. About half of the students did not know their daily F/V intake. The main barriers to F/V intake were "I think I'm consuming enough F/V" and "F/V is not always available when I eat outside of my home". A trend analysis demonstrated that vegetable intake (p < 0.01), the scores of positive attitudes (p = 0.038) and self-efficacy (p < 0.01) tended to increase as the stage of change behavior went up. Barriers to F/V intake tended to decrease as the stage went up (p < 0.01). The daily vegetable intake of the obese students (Rohrer index ≥ 145) showed significantly lower than that of the students with standard weight (p = 0.019). **Conclusion:** This study suggests a need to increase the students' awareness of the F/V intake recommendations; facilitating positive attitudes and self-efficacy might be useful intervention programs.

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Relationship between Monetary Diet Cost and Food Group Intake among Japanese Women (Aged 30–49 Years) with Good Nutrient Intake

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Keywords: Food group intakes · Diet cost · Nutrient intakes

Background/Aims: The study aimed to investigate the relationship between monetary diet cost and food group intakes among Japanese women with good nutrient intake. **Methods:** Food group and nutrient intakes were assessed using 1-day weighed dietary records of 923 Japanese women (aged 30–49 years) from the National Health and Nutrition Survey, 2014. Of 12 nutrients, the number meeting the standard values of the Dietary Reference Intakes for Japanese 2015 (DRIs) was calculated. Those who met the standards for 10 or more nutrients were defined as having good nutrient intake. Diet cost was estimated using retail food prices. Daily diet cost was calculated, then subjects were divided into three diet cost groups. Mean food group intakes were compared using ANOVA. Energy-adjusted values were used for both costs and intakes. **Results:** Only 68 (7.4%) subjects met the DRIs for 10 or more nutrients. Mean (SD) food group intakes of subjects with good nutrient intake were: rice 156.6 (72.4) g and noodles 19.9 (51.2) g in the grain group; tomatoes 20.0 (23.0) g, and green and yellow vegetables 41.4 (37.2) g in the vegetable group (each per 1000 kcal). Mean (SD) diet cost was 948.7 (286.5) JPY/day, and the energy-adjusted diet cost was 640.0 (137.7) JPY/1000 kcal. Comparison among diet cost groups showed that some food group intakes were higher in particular groups. **Conclusion:** Food group intakes differed according to diet cost. Further analysis will be performed to identify the food group intakes for achieving both good nutrient intake and low diet cost.

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A Survey of Carbohydrate Intakes, Circadian Rhythm of Appetite and Sleep among College Students

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Keywords: Carbohydrate · Appetite · Sleep

Background/Aims: Focusing on the intake of carbohydrates, this study aimed to examine the relationship with the circadian rhythm of appetite and sleeping time. **Methods:** The study population included 74 university students majoring in food and nutrition (male, n = 16; female, n = 58; aged 21 years). A self-administered questionnaire survey on the carbohydrate intakes, appetite, and sleep with brief-type self-administered diet history questionnaire was conducted in October 2014 and February 2015. **Results:** Eighty percent of subjects preferred sweets. Subjects classified by BMI as normal were 70.8%. The intake of energy, protein, lipid, carbohydrate, calcium, iron and salt equivalent tended to be lower than the national health and nutrition survey results in 2013. The number of steps per day was about 3000 steps more than the national results. The average of sleep time was 5.8 hours. The rhythm of the appetite was divided into the good and the inferior groups and the relationship with the food intake was examined. It was found that the inferior group had significantly more intake of cereals, potatoes, pulses, green-yellow vegetables, other vegetables, meat, milk and fats and oils, but there was no difference in carbohydrate intakes. The taste threshold of sucrose was higher when the seasoning at home was deep. The subjects preferred sweets, but there was no correlation between the rhythm of appetite and sweet taste. **Conclusion:** Adjusting the taste of everyday life to light taste is considered to be able to prevent excessive intake of carbohydrates and increase of appetite.

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The Role of Nutrition Improvement and Escape from Poverty – Postwar in Japan and Current Status of Developing Countries

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Keywords: Nutrition improvement · Livelihood improvement · Effort of the postwar in japan · Developing countries

Background/Aims: From the viewpoint of sustainable development, nutritional deficiency is a major adverse factor in quality of livelihood, especially in developing countries. The study aimed to understand the difference between present nutritional and health situation of developing countries and post-war Japan. Post-war Japan was selected as it has achieved a remarkable improvement in nutrition which may of relevance for the present day developing countries. **Methods:** Review and analyze relevant literature, documents and databases of the Japanese Ministry of Health, Labor and Welfare (MHLW) and Ministry of Education, Culture, Sports, Science and Technology (MEXT). The United Nations database was referred for the status of the developing countries. **Results:** A nationwide nutrition survey along with the establishment of relevant laws and institutions greatly improved nutrition in post-war Japan. Furthermore, Livelihood Extension Officers contributed to closing the nutrition gap between rural and urban areas through livelihood improvement activities notably providing effective direct and indirect nutritional guidance to rural women. Although the system was established by the General Headquarters, the Supreme Commander for the Allied Powers (GHQ) led to remarkable improvements in nutrition. Even so, additional actors were required to close the urban-rural nutrition gap. **Conclusion:** Present nutrition issues in developing countries are parallels with the period in Japanese history, thus lessons learned can be applied to the present day.

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Impact of Parental Obesity, Food Availability, and Dietary Intake on Preschool Children Obesity: A Case-Control Study

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Keywords: Parental obesity · Food availability · Dietary intake · Preschool children

Background/Aims: The trend of the increasing prevalence of childhood obesity is observed in developing country including Indonesia. The causes of obesity are multifactorial, determined by genetic and food environment. The study aimed to identify nutritional risk factors associated with obesity among preschool children in Kota Yogyakarta. **Methods:** In this case-control study, age and gender-matched 101 cases (weight-for-height above +2SD) and 101 controls (weight-for-height between –2SD to +2SD) preschool children between 3 to 5 years of age were recruited. Subjects were enrolled in the study based on the nutritional status screening result of 53 early childhood education (ECD) schools in Kota Yogyakarta. Those schools were selected using probability proportional to size method. Parental obesity was defined by body mass index above 25 kg/m^2. Availability of healthy and unhealthy food was assessed by Home Food Environmental Survey (HES) Questionnaire. Semi-quantitative food frequency questionnaire (SQFFQ) was used to assess daily energy and fat intake. Data were analyzed using descriptive statistics and McNemar test. Conditional logistic regression analysis was assessed to determine the dominant risk factor associated with obesity. **Results:** Parental obesity, healthy and unhealthy food availability were not statistically associated with obesity occurrence in preschool children (p > 0.05). Maternal obesity (odds ratio [OR], 1.29, 95% confidence interval [CI] 0.54–3.12), high energy intake (1.23, 0.725–2.117), and high fat intake (1.39, 0.88–2.22), significantly increased the risk of obesity. **Conclusion:** The dominant risk factors of preschool obesity were maternal obesity and high fat intake.

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Nutrition Achievement and Challenges in Malaysia

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Keywords: Nutrition achievements · Nutrition challenges · Malaysia

Background/Aims: Nutrition services was first introduced in Malaysia in 1950s at the Institute for Medical Research. In 1974, nutrition services were incorporated into the Maternal and Child Health Unit under the Family Health Development Division. The first batch of nutritionists was introduced to its services in 1960s.

The Nutrition Division was developed in 2009, to cover services which were not only limited to maternal and child health services. The expansion of scopes covers nutrition services in various settings such as schools, food establishment and supermarket and activities to promote healthy eating, as part of healthy lifestyle to combat non-communicable diseases. The implementation of nutrition programs in the country is guided via The National Plan of Action for Nutrition Malaysia (NPANM) to address food and nutrition challenges in the country by multi and trans-sectional agencies. These include relevant ministries and government agencies, research institutions, academia, professional bodies, non-government organizations including consumer groups and food industries. Malaysia is facing the rise of the double-burden and recently triple burden of malnutrition which includes stunting, anemia and increasing of over nutrition such as obesity. To address these issues, it needs continuous and collaborative efforts and commitment from various stakeholders. This paper will attempt to present the achievements and challenges of nutrition activities in Malaysia.

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The Chronic Non-Communicable Diseases Prevalence, Risk Factors of Hypertension and Obesity, and Nutrition Evaluation for Adult Women in Rural China: A Cross-Sectional Designed Survey

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Keywords: Childbearing women · Rural health · NCDs · Dietary intakes · Obesity

Background/Aims: The prevalence of chronic non-communicable diseases (CNDs) and dietary problems in adult women are increased following the changes of lifestyle and dietary imbalance, especially in rural districts. This study aimed to identify the CNDs burden and nutritional status among rural adult women and to assess the relationship between CNDs prevalence with lifestyle- and dietary-related risk factors. **Methods:** This was a cross-sectional designed survey using cluster random sampling. Demographic and CNDs data collection used physical examination and questionnaire. Dietary intakes were recorded using food frequency questionnaire (FFQ). Basic demographic information and disease-state characteristics was tested using multivariate logistic regression analysis model and a series of Pearson's Chi-squared analyses. **Results:** The most prevalent CNDs by self-report were hypertension (13.9%), chronic gastritis, anemia, diabetes and cancer. Physical examination showed that the prevalence of hypertension was 30.7%, body mass index (BMI) obesity prevalent rate was 24.3% and abdominal obesity was 46.9%. The risk factors for abdominal obesity were age, diabetes history, pesticide use, meat product intake, puffed food and carbonate beverages intake; while the protective factors were soybean food and fruit intake. The risk factors of obesity according to BMI were hypertension, carbonate beverages and cakes intake; while protective factor was soybean food intake. The risk factors for hypertension was hypertension history; while the protective factors were education, and intake of kelp, soybean food and fruits. The major participant's intake below or meet the

DRIs recommendation for most nutrients. **Conclusion:** Soybean food intake was protective factor both for hypertension and obesity.

Poster Presentation

1056

Comparison of Nutrition Education in Improving Knowledge and Nutrition Behaviour among Women of Reproductive Age in Urban (Jakarta) and Rural (Bogor)

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Keywords: Woman of reproductive age · Balanced nutrition · Knowledge · Maternal education

Background/Aim: Women should be exposed to health topics and be encouraged to participate in health promotion programs to promote healthy eating habits and achieve optimum nutritional status. Nutrition education is an essential aspect to optimize health of women of reproductive age, to improve pregnancy outcomes and to promote healthy behavioral changes. We studied the differences of nutrition education carried out in urban (Jakarta) and rural (Bogor) areas. **Methods:** We conducted a quasi-experimental design with pre-post-test measures of fifty women each from rural and urban areas. They were given education regarding maternal education (breastfeeding and complementary feeding) and balanced nutrition. They must fulfill the inclusion criteria: age 19–35 years, able to communicate well and willing to follow interventions until the end of the program. Subjects were given education once/3 weeks for 12 weeks. Before and after the intervention, they were interviewed about dietary intake, nutrition knowledge and behavioral, and balanced nutrition. **Results:** The results of the study showed that in rural and urban there were an increase of nutrition knowledge and behavioral and an improved diet (p < 0.05). However, there were no significant difference results between rural and urban (p > 0.05). **Conclusion:** It is concluded that nutrition education should consider women's beliefs in religion, tradition, culture and influence of family members. The educational approach should be designed differently for urban and rural areas.

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Determinant Factors of Hyperglycemia among Women Aged >45 Years Old in Cipayung, Depok, Indonesia

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Keywords: Diabetes mellitus · Hyperglycemia · Central obesity · Elderly women

Background/Aim: The prevalence of Type II Diabetes Mellitus (DM) in Indonesia is increasing rapidly. DM is related to higher risk of morbidity and mortality and characterized by increasing level of blood glucose (hyperglycemia). The risk of hyperglycemia n would also be increased by increasing age. **Methods:** This study aims to investigate factors related to hyperglycemia among women aged >45 years old in Cipayung, Depok. A cross-sectional study was conducted during November 2016 to January 2017 in elderly integrated post (*Posbindu*) in Cipayung, Depok with 399 subjects selected purposively. Blood glucose, blood pressure and plasma uric acid were measured using digital devices. Anthropometric data collected was weight, height, and waist circumference. Food intake data was collected using 1x24-hour food recall technique. Other relevant variables were collected through questionnaire. Data were analyzed using Chi-square and logistic regression methods. **Results:** The study found that the prevalence of hyperglycemia among subjects was 13.6%. Multivariate analysis shows a significant relationship between age (OR 2.2 CI:1.0–4.9) and central obesity (OR 3.0 CI:1.1–8.3) with hyperglycemia. **Conclusion:** In conclusion, central obesity is a dominant risk factor for hyperglycemia among women aged >45 years old in study area. Avoiding the development of central obesity is important to prevent the occurrence of DM.

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Effect of Front-Of-Package Traffic Light (FOP-TL) Nutrition Label Design on Acceptability and Understanding of Nutritional Labels among Patients with Hypertension

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Keywords: Hypertension · Front-of-Package Traffic Light · Nutritional label· Acceptance

Background/Aims: The behavior of reading nutritional labels and understanding information in nutritional labels in Indonesia, especially among patients with hypertension, is low. Front-of-Package Traffic Light (FOP-TL) label can be well received by the community compared to the nutritional value information label. Hypertension sufferers need to understand the FOPTL label to help them choose low-sodium foods. The purpose of the study was to assess the effect of nutritional label designs on the acceptability and understanding among patients with hypertension. **Methods:**

The quasi-experimental design study was applied and the study duration was three weeks. The control group (label nutritional value information, n = 11) and the intervention group (label FOP-TL, n = 10) were selected by purposive sampling. In the first week, the subjects were given a pre-test on nutritional labels with the help of dummy to find out the understanding of nutritional value information labels. In the second week, an education was given using different booklets and dummies according to the group. In the third week, a post-test was given and the acceptability on the nutritional label types was measured. **Results:** The results showed that there were significant differences in the increase of nutrition label understanding between control and intervention groups (p = 0.047) and there were differences in the average acceptability score in both groups (p = 0.021). **Conclusion:** FOPTL can be used to gain an understanding of good nutritional labels among hypertensive patients.

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Reducing Malnutrition in Cambodia. A Modelling Exercise to Prioritize Multisectoral Interventions

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Keywords: Cambodia, Children under 5 years of age, Integrated approach, Modelling, Stunting
Background/Aims: Undernutrition is a major contributor to child morbidity and mortality and poses a large burden to the economy, in Cambodia. **Methods:** This study explored factors contributing to child stunting and wasting and their regional inequalities among 1,938 Cambodian children aged 6–23.9 months. Data were drawn from a longitudinal study (year 2017) conducted in six districts of two north-eastern provinces and the capital and used as cross-sectional. Socio-demographic and household characteristics, children's feeding practices during the previous 24 hr, and children's length and weight measurements were collected. Gradient boosting models were used to calculate the contribution of determinants to child undernutrition whereas concentration index was used to assess the impact of those determinants on stunting and wasting inequalities among socioeconomic groups. **Results:** It was found that low-household wealth could predict 21% to 45% of child stunting and 23% to 36% of wasting across regions. After wealth, source and treatment of drinking water were found the second major predictor for stunting (15%) and wasting (21%). Combining child nutrition and household water, sanitation and hygiene indicators predicted around 30% of child undernutrition, either in the form of stunting or wasting. Mothers' education predicted >30% of stunting in the north-eastern region. Results highlight that a complex interplay of factors contributes to child stunting and wasting. An integrated, intersectoral, equity-focused approach that addresses children's dietary quality, household's water, sanitation and hygiene conditions, mother's education, and poverty is likely to yield the highest impact in achieving further gains in nutritional status among Cambodian children.

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Tempe, Isoflavones and Cognitive Function

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Keywords: Cognitive · Function · Isoflavones · Tempe
Background/Aims: Alzheimer's disease (AD) is the most common type of dementia and is characterized by worsening cognitive impairment affecting daily life. Factors that can enhance cognitive function are nutrients such as vitamin B6, vitamin B12, folate, and isoflavones. One of the foods that contains high level of isofalvones and folate and is widely consumed in Indonesia is tempe. The aims of research were to assess the efficacy of tempe drinks in increasing isoflavones in saliva and cognitive functions. **Methods:** The subjects were divided into two groups: the groups were given tempe flour 35 g (n = 15 elderly) and the other group was given 17.5 g casein (n = 15 elderly). Cognitive function measurement used MMSE and HVLT instruments. Analysis of isoflavones in saliva was done using HPLC. Analysis between treatments and before and after treatments used independent t-test. **Results:** The results showed that salivary isoflavones both in the tempe and casein groups increased significantly. Cognitive function measurement with MMSE in the tempe group was tended to be higher than in casein groups. The measurement with HVLT in the tempe group was tended to increase, while in casein group tended to decrease after the intervention. **Conclusion:** This study concludes that tempe tended to increase cognitive function and isoflavones in saliva among elderly.

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Maternal Folic Acid Supplementation and Birth Outcomes: A Cross-Sectional Study in Northwest China

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Keywords: Folic acid supplementation · Birth outcomes · Singletons
Background/Aims: Previous studies had yielded inconsistent results on the associations of folic acid supplementation with birth outcomes. This study aimed to To investigate the associations between maternal folic acid supplementation and birth outcomes in singleton pregnancy. **Methods:** A population-based cross-sectional study was conducted in Northwestern China using a stratified multi-stage random sampling method among 27 818 women with their singleton newborn. Folic acid supplementation was defined as women who took folic acid during the period of three months before conception and the first trimester. Multiple linear regression and binary logistic regression were used to evaluate the associations between folic acid supplementation and birth outcomes after adjusting for the major potential confounders. **Results:** Of 27

818 women with their newborn, 63.9% of singletons' mothers took folic acid. Compared with non-users, birth weight of newborns for women with folic acid supplementation were (17.3, 95% CI 6.1 to 28.4, P = 0.002) higher, women with folic acid supplementation was associated with lower risk of small-for-gestational-age (OR 0.85, 95% CI 0.80 to 0.92, P < 0.001) and low birth weight (OR 0.82, 95% CI 0.71 to 0.95, P = 0.008). **Conclusion:** Maternal folic acid supplementation was associated with increased birth weight and was inversely associated with the risk of small-for-gestational-age and low birth weight birth in singletons, which was being extensive benefits for maternal and child health.

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Determinants in the Acceptance of Nutrition Management Information System among Barangay Nutrition Scholars in Selected Municipalities of Laguna, Philippines

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Keywords: BIDANI · BNS · Nutrition database
Background/Aims: Nutritional assessment at the barangay level is the key in the success of the nutrition program management which requires proper targeting, collecting, processing, storing, analyzing and updating of data. The role of Barangay Nutrition Scholars (BNS) in documenting and record keeping is vital to come up with a reliable nutrition plan. The National Nutrition Council (NNC) developed the Operation Timbang (OPT) tool database to help the BNS generate the fast, reliable and accurate nutritional status of 0 to 59-month-old children. The Barangay Integrated Development Approach for Nutrition Improvement (BI-DANI) Network Program of the University of the Philippine Los Baños enhanced the BNS OPT database by merging it with the Barangay Management Information System (BMIS) for a better understanding of the nutrition situation at the barangay level and identify appropriate nutrition interventions to address the nutrition problem. The success and failure of introducing a nutrition management information system (BNS OPT tool plus BMIS) to the BNS's workplace rely on their perceptions to accept the system. Lack of user acceptance has long been an impediment to the success of new information systems (Davis, 1993). The technology acceptance model (TAM) specifies the causal relationships between system design features, perceived usefulness, perceived ease of use, attitude toward using, and actual user behavior. The study will show that the age, educational level, and computer literacy have a positive influence on the perceived usefulness and ease of use on the intention to adopt the NMIS.

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Estimation of Salt Intake and Sodium-to-Potassium Ratios among Elementary School Teachers in Kyoto, Japan

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Keywords: Dietary salt · Blood pressure · Sodium · Elementary school teacher
Background/Aims: Dietary salt intake is the main factor underlying high blood pressure (BP), and it is largely responsible for the increase in BP along with aging. In a previous study, we examined salt intake and sodium-to-potassium (Na/K) ratios obtained by urinary excretion among elementary school children in Kyoto, Japan. Effective programs for salt restriction in children should be promoted in elementary schools. In the present study, we examined the same items through urinalysis in elementary school teachers. **Methods:** A total of 176 subjects aged 23–64 years participated in health checkups conducted by schools in 2015 and 2017. After excluding duplicate subjects, the dietary habits of 103 subjects (37 males and 66 females) were confirmed by questionnaires. Urinary concentrations of sodium, potassium and creatinine were measured from first-morning urine samples. **Results:** The median values for estimated salt intake in males and females was 8.2 and 7.4 g/day, respectively. In 54.1 and 62.1% of the males and females, respectively, the estimated salt intake exceeded recommended dietary goal. The median urinary Na/K ratio (mEq/mEq) in males and females was 4.1 and 3.6, respectively. In 56.8 and 40.9% of the males and females, respectively, the urinary Na/K ratio exceeded 4.0. In this study, we found no association between the consciousness of the subjects regarding salt restriction and the estimated salt intake. **Conclusion:** These results suggested that it is important to evaluate salt intake objectively in order to develop effective education on the importance of salt restriction.

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Relationship Between Consumption Patterns and History of Exclusive Breastfeeding with Nutritional Status of Children in Oepoi Community Health Center, Kupang

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Keywords: Consumption patterns · Exclusive breastfeeding history · Nutritional status
Background/Aims: Malnutrition is one of the causes of infant and toddler deaths. Nutritional problems are generally caused by infectious diseases and low energy and nutrient intake due to lack of household food availability and wrong parenting. The Oepoi Primary Health Center had an increasing cases of malnutrition, in 2015 had 136 cases, in 2016 had 179 cases and in 2017 had 162 cases. This study aims to determine the relationship between con-

sumption patterns and history of exclusive breastfeeding with nutritional status of children under five in the Oepoi Primary Health Center in Kupang. **Methods:** The research was an analytical survey with a cross-sectional design. The population were families with children under five in the Oepoi Community Health Center. Sampling method was proportional stratified random sampling with a total sample of 90 respondents. Data collection was using interviews based on questionnaires. Data on consumption patterns (type, number, frequency) were collected using 2x24 hour food recall method. Data analysis used chi-square test with a significant level of α = 0.05. **Results:** The results showed that there was no significant relationship between consumption patterns and nutritional status of children under five (p = 0.617), and there was a significant relationship between the history of exclusive breastfeeding and the nutritional status of children under five (p = 0.006). **Conclusion:** Exclusive breastfeeding played an important role on the nutritional status of children under five years old.

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The Association Between Maternal Dietary Patterns During Pregnancy and Birth Weight and The Risk of Low Birth Weight

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Keywords: Dietary pattern · Birth weight · Low birth weight · Pregnancy · Peduced-rank regression model

Background/Aims: Evidence for the combined association of protein and carbohydrate intake during pregnancy with birth weight (BW) and low birth weight (LBW) is limited. This study aims to identify maternal dietary patterns (DPs) associated with protein and carbohydrate density and to examine their relationship with BW and LBW. **Methods:** The study employed data from a cross-sectional study in Northwest China. Total 7256 women were recruited using a stratified multistage random sampling method. Maternal diets were collected by a validated FFQ. DPs were derived from the reduced-rank regression model. Associations between DPs scores (continuous and by quartile) with BW and LBW were evaluated using generalized estimated equation and restricted cubic spline models. **Results:** Two DPs were obtained: the low-protein-pattern (high wheat, with low soybean products, fungi, nuts, animal source food) and the balanced-pattern (high wheat, soybean products, vegetables, fish, with low oils). There is no association between the low-protein-pattern and outcomes. The second and third quartile (Q2 and Q3) of the balanced-pattern score had significant increased BW (Q2: changes 29.8 [7.3, 52.2]; Q3: changes 23.1 [0.4, 45.9]) and reduce risk of LBW (Q2: OR 0.66 [0.48, 0.92]; Q3: OR 0.65 [0.48, 0.88]) than those of Q1. Nonlinear relationships were observed between balanced-pattern score and BW (P = 0.036) and LBW risk (P = 0.011). The median score of balanced-pattern was linked to the highest BW and the lowest LBW risk. **Conclusion:** Our findings suggest the joint effect of protein and carbohydrate intake on BW. Balanced diets with appropriate proportion of macronutrients are important for the prevention of LBW.

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The Influence of Nutritional Counselling towards Behaviour on Food Selection in Patients with Hypertension

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Keywords: Nutritional counselling · Hypertension · Behavior of food selection

Background/Aims: Hypertension is one of diseases with high prevalence in Indonesia. In 2013, the prevalence of hypertension in West Java Province was 29.4%. Health education become a specific intervention in increasing knowledge and changing behavior in food selection. This study aimed to investigate the effect of nutritional counseling toward behavior of food selection in hypertensive patients in Purwakarta District, West Java Province, Indonesia. **Methods:** Study design was one group pre-test and post-test and 32 hypertensive patients were recruited as respondents. Nutritional counseling was given twice per 2 weeks (each ±30–60 minutes) by Nutritionist. Data about knowledge, attitude, and behavior of food selection were collected by structured interview used validated questionnaires. Paired t-test was used to analyze differences of behavior of food selection before and after treatment. **Results:** Results showed that nutritional counseling influenced knowledge, attitude, and behavior on food selection among hypertensive patients (p < 0.05). Level of knowledge, attitude, and behavior increased to 50.53%, 7.78%, 22.62%, respectively. Most of respondents only knew that main source of sodium was salt, so they were not worried to consume foods high in sodium, such as canned sardines and cakes that contain baking powder. **Conclusion:** Giving nutritional counseling to hypertensive patients improved their behavior in selecting foods.

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Increasing Knowledge on the Implementation of Integrated Health Post (*Posyandu*) through Nutrition Education in North Jakarta

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Keywords: Nutrition education · Knowledge · Implementation posyandu

Background/Aims: *Posyandu* (Integrated Health Post) functions to monitor growth of under-five children at the community level. Cadres as managers of *Posyandu* must have good abilities and skills in implementation *Posyandu* activities. The objectives of this study was to measure the changes of knowledge on Posyandu implementation, nutrition in the first 1,000 days and balanced nutrition after a nutrition education intervention. **Methods:** The design of

the study was quasi experimental with the intervention was nutrition education through a three-day workshop. This study was conducted in 29 *Posyandu* in North Jakarta City. Fifty-four cadres involved in three-day nutrition workshop and their knowledge was assessed. Nutrition education used four modules that had been developed earlier. **Results:** The results showed that the average age was 46 years old, with a range of 24–60 years old. Most of them had high school education and as housewives. The average of pre-test score was 51.95 and the average of post-test score was 66.23, so there was an increased in score of 14.3 point or 28.1%. The biggest increase was on the recommended portion of food a day and cadres' activities other than the *Posyandu* schedule, while the smallest increase in score was the functions of *Posyandu* and the minimum number of cadres. **Conclusion:** The results of three-day nutrition education can improve cadre knowledge that can be applied to other *Posyandu*.

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Nutrition Determinant of the Community through a Social Capital Model in the Improvement of Nutritional Status and the Quality of Life

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Keywords: The quality of life · Elderly nutritional status · Social-economy · Family

Background/Aim: Nutritional status is an important factor for improving quality of life among elderly. The study objective was to analyze nutrition determinant on the quality of life of free-living elderly using social capital model. **Methods:** The study was observational analytic, subjects were elderly and data were analyzed using pathway analysis. **Results:** The mean of subjects' age was 70.2 y (SD 9.25; min-max: 61–88 y). The prevalence of smoking was 46.2%, of hypertension was 13.4%, and of elderly who did not consume vegetables and fruit every day was 36.1%. Those who did not consume vegetables and fruit every day were at risk of hypertension ($r = 0.177$, $p = 0.025$). Study showed that there was a significant relationship ($p = 0.043$) between gender, age, educational level, income, type of exercises performed, productive friendships such as recitation and social gathering with the quality of life. The quality of elderly life was directly related to peer support, positive behavior, educational level, and income. Factors of balanced nutritional behavior, healthy living and family support explained 77.1% of the quality of life elderly among elderly. **Conclusion:** Peer and family support, positive behavior, and good nutrition were key determinants of quality of life among elderly.

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Demographic Characteristics, Nutrition and Health Status, and Food Intake of Fishermen in the Philippines: A Review of the 8th National Nutrition Survey

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Keywords: Fishermen · Fishing industry · Malnutrition · Public health

Background/Aims: The fishing industry is a significant producer of food in the Philippines, yet Filipino fishermen remain to be one of the most marginalized sectors. This review aims to analyze the demographic characteristics, nutrition and health status and food intake of households headed by Filipino fishermen using the 8th National Nutrition Survey conducted in 2013. **Methods:** Using a nationally representative sample (n = 19,000), descriptive statistics such as mean and percentages were generated using the survey module of Stata. **Results:** Households headed by fishermen have lower education levels and higher average household size than the general Filipino households. Majority of the fishermen belong to the poor and poorest quintiles. Filipino fishermen had lower prevalence in all forms of malnutrition, anemia and diabetes than the Filipino adults in general. Prevalence of hypertension among fishermen was almost the same as that of the general adult population. A high percentage of households headed by fishermen were current smokers and drinkers. Majority had high physical activity than the general adult population. In terms of energy and nutrient intake, fishermen had lower energy, protein, iron, vitamin A, calcium, vitamin C and fat intake yet higher carbohydrates than the general Filipino adults. They also had lower percentage of households meeting the energy and nutrient intake compared to Filipino households in general. Based on the review, the information that was available suggests that households headed by fishermen may be a vulnerable sector. **Conclusion:** Policies and programs directed to households headed by fishermen may be crafted and enforced to help improve their condition.

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Level of Free Thyroxin Hormone (FT4) during Pregnancy in Areas with History of Iodine Deficiency

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Keywords: Thyroid hormone · Function · Iodine

Background/Aims: Iodine deficiency in pregnant woman can affect growth and development of fetus. People who live in an area that affected by iodine deficiency in the past may have abnormal thyroid function. The study aimed to assess the level of thyroid hormone in pregnant women in areas with history of iodine defi-

ciency. **Methods:** Cross-sectional study was conducted in two types of location (replete and non-replete area) in Magelang, Central Java, Indonesia. Pregnant women 15–45 years old without pregnancy complication was a sample criterion. Free thyroxine hormone (fT4) and Thyroid Stimulating Hormone (TSH) level were categorized by American Thyroid Association standard for pregnant women. **Results:** Two hundred and forty-two pregnant women participated in this study. Median of fT4 and TSH in both areas indicated in normal range, 0.14 (0.37–0.5) ng/dL and 0.28 (0.01–0.67) ng/dL, respectively. Median of fT4 in non-replete and replete area was 0.18 (0.63–0.5) ng/dL; 0.12 (0.37–0.95) ng/dL, respectively. Median of TSH in non-replete and replete area was 0.27 (0.09–0.21) ng/dL; 0.3 (0.01–0.67) ng/dL, respectively. Correlation between fT4 and TSH was showed in both areas with r = –0.23 (<0.05) and in non-replete area, r = –0.39 (<0.05). But, it was not significant in replete area, r = –0.08 (>0.05). Scatter plot showed that level of fT4 in the replete area higher than non-replete area that has an equal level of iodized salt (+40 ppm KIO3). **Conclusion:** Difference of distribution pattern on fT4 level between replete and non-replete area might be showing a tendency of thyroid function abnormality on replete area.

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Facts and Misbelieves – Lifestyle Study in Hungary among 11–18 Years Old Young

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Keywords: Young · Dietary diary · Healthy lifestyle · Education · Nutrient intake
Background/Aims: The lifestyle, attitudes and knowledge levels of children have a significant impact on the prevention of lifestyle-related non-communicable disease in later stages of life. The aim of this survey was to familiarize the lifestyle of young people with regard to their eating habits, knowledge and daily intakes. **Methods:** The study used 11–18 years old participants (n = 800). Anthropometric measures, three-day dietary diary, and a lifestyle-related attitudes-knowledge-level questionnaire were used. **Results:** Of the subjects, 70% considered their own lifestyle was healthy and only very few (3%) considered was unhealthy. They think the healthier way of life would be more achievable by doing more sports and more persistence. Distribution of young people by BMI categories were: 7.3% thin, 69.1% normal, 18.4 overweigh, and 5.1% obese. The average of the daily energy consumption met the recommendation in both sexes and in the group of 11–14 years old. Energy intake from fat (en%) was 35–36 in both sexes and all age group. Energy intake from carbohydrates was 49 en%, but the energy intake from added sugar was high (11.7 en%). The ratio of n-3 and n-6 fatty acids was 1:27 in average. **Conclusion:** The lifestyle of young people need improvement in order to have healthy lifestyle in adulthood.

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The Minerals Composition of Indonesian Rice

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Keywords: Rice · Nutrient · Element
Background/Aims: Rice (*Oryza sativa L.*) is one of the staple foods widely consumed by Indonesian people. They usually have rice as the biggest portion in their diet, therefore rice becomes the main source of nutrients of Indonesian people mainly for those who live in Java Islands. Rice contains various minerals, some are essential nutrients and some not. Therefore, mineral contents in rice are needed to be characterized. This research focused on the assessment of minerals content in Indonesian rice using nuclear analytical techniques and related methods. **Methods:** The rice was collected from several locations in Java Islands in order to see the variation caused by the topography from the Islands. Quality control of data analysis was assessed using SRM NIST Rice Flour 1568a and gave good results with accuracy (% bias) ≤ 5% and precision (%CV) less than 10%. **Results:** The essential mineral contents such as Fe, Zn, K, Mn, Ca and Cu were quantified and found in the range of 1.2–609, 24–288, 3260 –5700, 15–111, 441–860 and 13–32 mg/kg respectively, while for other minerals Cr and Co in rice were also quantified. **Conclusion:** These results of mineral contents in rice were then could be used to estimate daily nutritional intake status of Javanese people.

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The Effect of JARI on Knowledge and Attitude about Snack Food Selection among Students in 5th Grade Elementary School

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Keywords: Board game · Nutrition education · Media education · Snack food board game
Background/Aims: Nutrition education is an important mean to increase knowledge and attitude on nutritious snack consumption. To provide nutrition education for school children, innovative tools are needed, such as media games using board games. This study was aimed to determine the effect of JARI (*Jajanan Sehat Bergizi*) game media on knowledge and attitudes regarding the selection of snack foods for 5th grade elementary school students. **Methods:** This study used a quasi-experimental design with pretest-posttest design with a control group. This study used total sampling with all 115 students in the 5th grade elementary school were divided into intervention group (n = 57) and control group (n = 58). **Results:** Most respondents in the treatment group (92.9%) and in the control group (86.2%) were in the age range of 10–11 years. There was a difference in knowledge and attitude between treatment group and control group after the intervention was given (p > 0.05). **Conclusion:**

JARI games can influence changes in knowledge and attitudes regarding the selection of snacks for students in grade 5th elementary school.

Association between Meat Consumption and Inflammation among Middle-Aged and Older Adults with and without Metabolic Syndrome Community-Dwelling Individuals

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Keywords: Metabolic syndrome · C-reactive protein · Meat consumption · Adults

Background/Aims: Metabolic syndrome (MetS) is a significant risk factor for the development of cardiovascular diseases. Chronic low-grade inflammation was associated with diet played an essential role in MetS development. High sensitivity C-reactive protein (CRP) is the best inflammation biomarker and predictor for future cardiovascular events. Only a few studies investigate the relation between meat consumption, inflammation, and metabolic syndrome (MetS). **Methods:** This cross-sectional study aimed to assess relationships between meat consumption and high sensitivity C-reactive protein (hs-CRP) as an alternate measure of inflammation in adults with and without MetS. A total of 282 participants from a community in Taiwan with MetS (n = 141) and without MetS (n = 141) aged 35–84 years were included. MetS components (waist circumference, blood pressure, glucose, triglycerides (TG), and high-density lipoprotein cholesterol (HDL)) were measured. The International Diabetes Federation (IDF) criteria have defined metabolic syndrome as recommended. Intake of meat was derived from a simple food frequency questionnaire. Anthropometry measures, blood pressure, lipid profiles, and plasma hs-CRP were evaluated using the standard method. Hs-CRP was categorized as high if the value >0.1 mg/L. **Results:** Daily meat consumption (P = 0.048) was significantly associated with hs-CRP in metabolic syndrome participants. No significant relationships were observed between meat consumption and hs-CRP among those without MetS. These findings indicate that among those with MetS, hs-CRP may be sensitive to meat consumption. **Conclusion:** This study provides evidence supporting the influence of meat consumption on hs-CRP among adults with metabolic syndrome.

Increasing Energy Intake on Weekend Days as Risk Factor for Body Weight Gain among Adolescents in Urban Areas

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Keywords: Energy · Weekend body · Weight gain · Adolescent

Background/Aims: Obesity is a major public health problem worldwide because of its high prevalence especially in urban areas. It is widely recognized that energy intake is associated with nutritional status. Several studies showed an increased intake of energy and macro nutrients on weekends will increase body weight. The aim of this study was to evaluate the association of energy intake at weekend days with body weight gain among adolescents in Indonesia. **Methods:** Design of this study was case control study with total sample was 72 adolescents aged 16–18 years. Cases were students who gained body weight gain after weekend day. We randomly selected controls from the same school at a ratio 1:1. Data was obtained using food recall during weekdays and weekend and semi quantitative food frequency questionnaire to assess the habitual energy and macro nutrient intake. **Results:** Energy intake during weekends was significantly higher in case group than that in control group (p = 0.001). A total of 51.4% children demonstrated the increasing intake energy at weekends. Subjects with increasing energy intake at weekends had 4.55 (1.69–12.25) times higher risk for gaining body weight. **Conclusion:** The increasing of energy intake at weekend days was a risk factor for body weight gain among adolescents. It is important to monitor energy intake at weekend as preventive strategy for body weight gain.

Urinary Sodium to Potassium Ratio among Indonesian Schoolchildren

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Keywords: Sodium · Potassium · Schoolchildren · Sodium to potassium ratio

Background/Aims: Sodium (Na) and potassium (K) are essential electrolytes that have important role for growth and development of children. Population studies revealed that an excessive Na and limited K consumption intake have frequently reported to increase risk of cardiovascular diseases and more strongly associated with blood pressure than either Na or K alone. Spot electrolyte urine was highly correlated and had been validated with gold standard to estimate electrolyte dietary intake. This study aimed at predicting sodium, potassium, and urinary Na/K ratio using morning spot urine samples among Indonesian schoolchildren. **Methods:** A cross sectional study was carried out among 155 healthy elementary students aged 9–12 years. Spot urine samples were collected and analyzed for Na, K, and creatinine. Predicted 24 h Na and K excretions were calculated using the equation of Remer study (for

creatinine). A total of 80 boys and 75 girls were recruited as samples. **Results:** This study demonstrated that the estimated urinary Na were 105.42 ± 66.05 mmol/day, urinary K were16.39 ± 12.57 mmol/day, and the mean of Na/K ratio were 7.71 ± 4.02 (mmol) or 4.55 ± 2.37 (mg). All electrolyte values did not differ significantly between boys and girls (p > 0.05). On average, the Na intake was higher than the recommended value. All subjects showed a very low potassium intake. The unfavorable Na/K ratio was indicative of negative health effects at later stages in life. **Conclusion:** The present study suggests the need for policies to reduce Na intake and increase dietary K among schoolchildren.

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The Relationship of Nutritional Status, Diversity of Food Intake and Habitual Breakfast Towards the Achievement of Learning at School in Teenage Girl in Yogyakarta

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Keywords: Nutritional status · Teenage girl · Diversity of food intake · Habitual breakfast · Learning achievements
Background/Aims: The prevalence of undernutrition among teenage girls is still a problem in Indonesia. One of the reasons is low food intake, monotonous diet and habitual breakfast. One of consequences of undernutrition and iron deficiency anemia is the difficulty of concentrating during learning process. This research was conducted to find out the relationship between nutritional status, diversity of food intake and habitual breakfast towards achievement of learning at school among teenage girls in Yogyakarta. **Methods:** This research was done using cross sectional in high schools in Yogyakarta. As many as 178 respondents were randomly selected for data collection. Data on nutritional status will be obtained by the measurement of anthropometry and analyzed using the software WHO Anthro. The diversity of food intake data and habitual breakfast of respondents will be obtained with the interview questionnaire, while learning achievement data would be obtained by taking the average value of the student's report. Data will be analyzed using the statistical software with chi-square test on p-value <0.05.

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Nutrition Status, Lifestyles, and Metabolic Risk of Students from Alor Living in Salatiga

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Keywords: Alor · Antropometric · Metabolic · Consumption
Background/Aims: In small but modern city of Salatiga, Central Java lives 67 UKSW students from Alor NTT, a region known for its health and nutritional concern for long period of time. It is of interest to investigate how those students adapt to cardio-metabolic risky city environment. The objective of this study was to describe anthropometric profiles, lifestyles and consumptions of students from Alor living in Salatiga, and to correlate these variables with their metabolic profiles and metabolic risks. **Methods:** This cross sectional study included data collection on individual identity, anthropometry, food consumption (FFQ), lifestyles, biochemical/clinical measurements, and disease history. Twenty-seven students met the inclusion criteria. **Results:** Anthropometric profiles of the students were mainly having normal nutritional status as indicated by BMI and waist-to-hip ratio. Of the women, 41% were thin and 5.9% obese. Those who had lived in Salatiga for 3 years or more were more overweight than those who stayed shorter period. The biochemical assessment of e data showed also that proportion of overweight increases as the year to stay in Salatiga gets longer than 3 years. The student's biochemical/clinical profiles are mainly in normal range (blood pressure, blood glucose, and total cholesterol), except for blood uric acid which was higher than normal. The anthropometry variables were correlated significantly with food consumption **Conclusion:** Students from Alor respond to the conditions in Salatiga by adapting their consumption and consequently had an increasing metabolic risks.

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Association of Smoking Behavior in Family and Optimal Age of Complementary Feeding Introduction on Stunting among Children Under Five in Depok

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Keywords: Smoking behavior · Age of introduction of complementary feeding · Stunting · Children under five
Background/Aims: The prevalence of stunting in Indonesia in 2013 was 37.2% and it is considered as severe public health problem based on WHO. In Sukmajaya Depok, a sub-district in West Java, the prevalence of stunting in children under five was more than 20% in 2017. The purpose of this study was to investigate the association of stunting risk factors, i.e. smoking behavior in family, optimal age of introduction of complementary feeding and consumption of high risk foods (food with preservatives, sweets and savory food) between stunted and non-stunted under five children in Sukmajaya Depok. **Methods:** This research used case-control

design and data were analyzed using chi square analysis. Subjects were taken purposively and the number of subjects obtained were 157 children (77 stunting and 80 control). Stunted children were matched for sex and age group with non-stunted children. **Results:** The study showed that smoking behavior in family was significantly associated with stunting (p = 0.023; OR = 2.262) and optimal age of introduction to complementary feeding was inversely associated with stunting (p = 0.042), OR = 0.50). There was no association between consumption of high risk foods to stunting prevalence in children under five (p = 0.144). **Conclusion:** Stunting was associated with smoking behavior in the family and age of introduction to complementary feeding.

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The Interaction Between Morbidity and The Nutritional Status among Children Under-Five in Cambodia: A Longitudinal Study

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Keywords: Stunting, Wasting, Anthropometric failure, Morbidity, Children under-five

Background/Aims: Even though there is limited evidence available, the relation between morbidity and undernutrition is suggested to be a strong two-way association among young children. **Methods:** This study aims to explore this vicious cycle by employing longitudinal data from 7,632 children. Types of malnutrition were indicated by z-scores of anthropometric measures, while morbidity by the number sick days experienced between Follow-up visits. The relation between these two was assessed with mixed-effects models where dependency of morbidity and nutritional status was interchanged; models considered as co-variables: province, age, gender, wealth index score, maternal education level, diet and WASH indicators. **Results:** Stunting was identified in 29.9% from all observations, wasting in 8.9% and two or more anthropometric failures in 21.3%. Children identified as wasted were 35% more likely to experience prolonged periods of sickness (OR:1.35 95% CI: 1.02–1.56. Those experiencing *High* proportion of sick days were 64% more likely to become stunted (OR:1.64 95% CI:1.18–2.29), equivalent to 7.5 additional sick days per year. This study suggests that the link between wasting and stunting could be partly explained by acute illness, where children with sub-optimal weight-for-height are more likely to experience a prolonged duration of sickness, which increases the risk of becoming stunted..

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The Influence of Age-Appropriate Feeding Practices on The Growth of Cambodian Children: A Longitudinal Study

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Keywords: Feeding practices, nutritional status, child's growth, wasting, stunting

Background/Aims: In early life, age-appropriate feeding practices are vital in achieving an optimal nutritional status. This paper aimed to determine the compliance and impact of feeding practices with age specific Cambodian National Nutrition guidelines. **Methods:** The study used information from 3,120 children with ages 0–12 months, participants to "MyHealth" cohort study. Data was collected four times in three provinces in Cambodia. The feeding practices are assessed through Appropriate Daily Feeding practices (ADF). Linear mixed-effect models were used to estimate the impact of determinants, including age, sex, nutritional status, socio-economic status, and water and sanitation conditions, on the growth of participants followed by z-scores of anthropometric measures, weight-for-age (WAZ), height-for-age (HAZ) and weight-for-height (WHZ). **Results:** At the entry point, stunting and wasting prevalence was of 13.5% and 13.1%. Over time, means of z-scores and adherence to ADF declined significantly. The adherence to ADF criteria showed significant influence in adjusted models to an estimate of +0.05 SDs of WHZ in adjusted models. A low wealth index score, low maternal educational level, rural location and more months of age were associated with significant drops in all z-scores. The influences of wasting on HAZ and stunting on WHZ suggest a strong interaction between forms of undernutrition. Among young Cambodian children, the adherence to age-specific feeding practices are important for the WHZ values, while the socio-economic indicators can explain to the highest degree the changes in z-scores. The risk to develop multiple forms of undernutrition is impacted by the presence of either stunting or wasting.

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The Effect of Nutrition Care Process on Knowledge, Attitude and Practice in Feeding among Mothers with Stunting Children

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Keywords: Nutrition care process · Knowledge · Practice · Stunting

Background/Aims: Nutrition care process can improve knowledge, attitude and practice, especially in feeding practice. Giving an appropriate feeding is expected to improve the nutrition status of stunting children. This study aimed to examine the effect of nutrition care process to the knowledge, attitude and practice in feeding among mothers with stunted children. **Methods:** This quasi-

experimental study used non-randomized pre- and post-test with control group design, conducted on July – October 2018 in Piyungan Subdistrict, Bantul District, Yogyakarta. Forty-four mothers with stunted children aged under five years old were divided into 2 groups; intervention group received nutrition care process for 3 months and control group received leaflet. Nutrition care process included assessment, nutrition diagnosis, intervention and monitoring and evaluation which were carried out by trained field enumerators. Knowledge, attitude and practice were assessed by validated questionnaire. Differences between pre and post-test in knowledge and attitude were analyzed using paired t-test, while in practice using Wilcoxon ranked test. **Results:** Scores of knowledge, attitude and practice before intervention were 14.9 ± 2.9, 54.9 ± 6.1 and 10.9 ± 1.5, respectively. The knowledge was significantly increased after intervention to 18.2 ± 3 (p = 0.000), but not for attitude (p = 0.697). The practice also increased to 12.1 ± 1.4 (p = 0.000). **Conclusion:** Nutrition care process can improve knowledge and practice of mothers but not attitude.

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Dietary Structure and Nutrient Intake of Urban and Rural Residents in Nanjing, China: A Cross-Sectional Study

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Keywords: Nutritional surveillance · Dietary pattern · Nutrients intake
Background/Aims: The study aimed to assess the dietary pattern and nutrient intake status of urban and rural residents in Nanjing, a big city in China, where the incidence of nutrition-related diseases among residents is increasing sharply. **Methods:** A sampling method by multiple stage probability proportional to the population size was used in this study. As many as 1,062 households and 2,386 people were enrolled to take dietary survey and health questionnaires. **Results:** The average intakes of whole grains and beans, tubers, fruits, soybeans and nuts, milk and milk products were 17.0 g, 17.9 g, 54.3 g, 19.1 g, 51.4 g reference person per day respectively, which were far below the recommended intakes. But, intake of red meat, poultry meat, oil and salt were 122.1 g, 39.4 g, 10.7 g respectively, which were much higher than the recommended intakes. The energy sourced from carbohydrate (49.1%en) was low, but from fat (37.1%en) was too high. The food sources of energy were mainly from cereals, animal source foods and oils, which accounted for 45.2%en, 23.4%en and 16.8%en, respectively. The average intakes reference person per day of vitamin A, vitamin B1, vitamin B2, vitamin C, potassium, calcium, zinc and selenium were relatively inadequate. **Conclusion:** The dietary pattern of Nanjing residents was unreasonable. The intakes of whole grains and beans, potatoes, fruits, soybeans and nuts, milk and milk prod-

ucts were insufficient, while the intakes of red meat and poultry meat, oil and salt were too high. The energy ratio from carbohydrate was low, but from fat was too high. The dietary pattern had a clear trend of "Westernization".

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Parents' and Teachers' Perspectives on Dietary Interventions in Obesity School Children in Manado City

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Keywords: Obesity · Diet · School children
Background/Aims: Obesity is a multi-factorial disease, which can interfere with health. Obesity has become a serious health problem in many countries around the world. WHO states that obesity is already a global epidemic that must be addressed immediately. Indonesia has become a country with high rate of child obesity. Based on National Health Survey (*Riskesdas*) in 2007 and 2010, there is an increase from 6.4% to 9.2%; while in 2013 has increased with the combined prevalence of overweight and obesity at 18.8%. The prevalence of child obesity in North Sulawesi Province reached 6.4%, while in Manado City 5.3%. **Methods:** This research was descriptive study with explanatory design of mix method. Qualitative research was carried out with a grounded theory approach. **Results:** The percentage of overweight among school children was 8.5%, whereas obesity was 10.5%. The knowledge and attitude of teachers about obesity was low. Teachers had concerns about obesity problems and its impact on health, and gave advice to increase physical activity, to be on diet and to reduce weight. The existing dietary intervention followed the MOH guidelines. Parents' knowledge about obesity was low. Some parents felt unfortunate for their obese children, while others had nothing to worry about it. The actions of parents regarding child obesity was advice on diet and increasing physical activities. **Conclusion:** Teachers and parents had different level of knowledge and attitude towards child obesity.

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Interview with Elderly People in Palau

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Keywords: Palau · Elderly people · Food · QOL

Background/Aims: The home visits to the subjects of the former survey about 20 years ago at the Palau Old Age Center and the interviews about the present life including the persons living together, housing, toilet use and religion were carried out and the effect on Quality of Life (QOL) was discussed. **Methods:** The number of subjects of the survey from 1996 to 1999 was 145 and 25 people still lived. We visited 20 people (a 79-year-old man and 19 women at the age of 80.5 ± 7.0). As one of the women was bedridden and could not talk, her daughter was interviewed instead. The other 19 people were independent in terms of ADL (activities of daily living). **Results:** Regarding family composition, two persons out of twenty lived by themselves (one of the two had a cat) and the others lived with family. Five people still went to the Palau Old Age Center. One of the five was in a wheelchair and her family took her there. Those who had active communication frequently exchanged foods and crops with their children, friends and other relatives compared to those who did not actively communicate the same as in 1999. Their satisfaction level on QOL and health by self-evaluation had a high rating as well. **Conclusion:** Old people from Palau Old Age Center had good QOL.

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Screening for Diabetes Risk in University Employees in Singapore

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Keywords: Diabetes · Employees · Screening · Singapore

Background/Aims: Singapore has one of the highest incidences of diabetes worldwide, with approximately 606,000 of adult Singaporeans suffering from diabetes. By 2050 the number is expected to rise to one million. The study aimed to promote diabetes awareness among university employees and to identify those at risk of diabetes. **Methods:** The Singapore Institute of Technology delivered a Diabetes Risk Screening Day event in November 2018. Ten stations were opened for half-day diabetes risk screening at the university campus by undergraduate physiotherapy students supervised by a dietitian. This included: screening (Finnish Diabetes Screening tool), individual explanations of results, optional random blood glucose (RBG) measurements and health promotion messaging. A five question post-event satisfaction survey was sent to all participants. Data was analyzed using IBM SPSS. **Results:** Seventy-seven employees (61% females) of 400 employees attended the event. The majority were under 45 years (70%), mean BMI was 23.3 kg/m^2, were at low risk for diabetes (67.5%) but had familial diabetes risk. Twenty-two per cent of participants (n = 22) showed slightly elevated risk for diabetes. Mean RBG was 6 mmol/l (n = 28). There was no significant gender difference in BMI or diabetes risk. Forty participants answered the post-event survey, with the majority rating the event as very good (45%), and that attending the event improved their understanding about diabetes (82.5%). Organizational diabetes health promotion can improve knowledge of risk within employee cohorts. **Conclusion:** Opportunities exist to expand this approach to reach a larger cohort of employees and to adapt diabetes screening tools to suit Asian population groups.

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Motivational Factors of Village Health Volunteers (VHV) Delivering Nutrition Services in Cambodia

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Keywords: Motivation · Village Health Volunteers (VHV) · Communities

Background/Aims: To assess factors that motivate Village Health Volunteers (VHVs) to support nutrition interventions in their communities. **Methods:** Helen Keller International (HKI) conducted 12 in-depth interviews (IDIs) and 12 focus group discussions (FGDs) with 72 VHVs across four provinces (three FGDs and three IDIs per province). **Results:** The most commonly cited motivations to become a VHV were: (i) To help the community and/or to improve overall health; (ii) To learn about health issues; and (iii) To teach others about health issues. The most commonly cited motivations to continue working as VHVs were: (i) Seeing improvements in community members' health and/or a desire to see such improvements; and (ii) The volunteers' increased reputation, influence, and leadership status in their communities. Three out of twelve of the IDI respondents cited financial and other material incentives as a motivation to become VHVs, while 4/12 FGD respondents and 5/12 IDI respondents cited financial and other incentives as a motivation to continue their role as VHVs. **Conclusions:** The findings of this study strongly corroborate the assumption that VHVs are individuals who wish to donate their time to improve the lives of others in the community. VHVs appear to derive real encouragement and motivation from their role in improving the health and lives of their community members. Nevertheless, financial support was frequently suggested by volunteers as an important motivation for them to continue their work. Programs that engage VHVs should seek to balance appropriate financial incentives with community recognition activities.

The Influence of Nutrition Education and Food Supplement Toward Nutrition Knowledge of Mothers, Intake of Energy, Protein, and Zinc, and Body Weight and Height of Stunting Children in Malang

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Keywords: Nutrition education · Food supplement · Nutrition knowledge · Stunting

Background/Aims: The aim of this research was to analyze the influence of nutrition education and food supplement toward nutrition knowledge of mothers, intake of energy, protein, and Zn, and on body weight and height of stunting children. **Methods:** The number of sample was 31 children. This research was conducted from August-November 2018. Paired sample test was conducted and Wilcoxon test was also done to anticipate data which were not normally distributed. **Results:** The average newborn weight was 2.7 kg and the length was 48.6 cm. The average mothers' knowledge about nutrition before intervention was 59.2 and after intervention was 74.4, with an increase of 15.2. The average body weight before intervention was 11.4 kg and after intervention was 12.8 kg, with the average increase was 1.4 kg. The average height before intervention was 85.4 cm and after intervention was 87.8 cm, with the average increase was 2.4 cm. The level of energy consumption before intervention was 681.5 kcal and after intervention was 691.9 kcal, with the average increase was 10.4 kcal. Protein consumption level before intervention was 23.2 g and after intervention was 27.2 g, with an increase of 4.0 g. Zn consumption level before intervention was 2.4 mg and after intervention was 0.8 mg, with an increase of 1.4 mg. **Conclusion:** There was an influence of nutrition education and food supplement towards mothers' knowledge of nutrition, intake of energy and Zn, and infants' weight and height.

Association between Consumption of Caffeinated Drinks and Quality of Sleep and Hypertension Occurrence among Bus Drivers of Cipta Karya Company

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Keywords: Bus driver · Caffeine · Hypertension · Sleep quality

Background/Aims: Night bus drivers are at higher risk of hypertension. This was influenced by several factors such as caffeine intake, sleep quality and frequency of caffeine consumption. The study aimed to know the association between caffeine consumption and sleep quality with hypertension. **Methods:** This study used cross sectional design. Samples of the study were 50-night bus drivers at Cipta Karya Pondok Pinang company. Caffeine intake and consumption frequency were obtained by using FFQ. Sleep quality data was gathered by using PSQI form. Bivariate statistic was applied using Chi square test. **Results:** The result showed that there were significant association of sleep quality and caffeine consumption with hypertension (P = 0.022 and p = 0.027 respectively), however there were no significant association between frequency of caffeine consumption with hypertension (P = 0.667). **Conclusion:** Sleep quality and caffeine consumption was associated with hypertension among night bus drivers.

South East Asian Nutrition Surveys II: Examining Nutritional Status, Growth, and Physical Activity of Children in Southeast Asia

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Keywords: Nutrition survey · Southeast Asia children · Study design

Background/Aims: Prevention of stunting and micronutrient deficiencies and control of overweight/ obesity and diet related non-communicable diseases are in the heart of all nutrition strategies in Southeast Asia. However, lack of comprehensive data in children is a barrier that prevents solutions and strategies to effectively address the dual burden of malnutrition and hidden hunger. The South East Asian Nutrition Surveys II (SEANUTS II) builds on the work, experience, and findings gained through the conduct of SEANUTS I in 2010–2011. It is a multi-country collaboration with research institutes of four South East Asian countries – Malaysia, Indonesia, Thailand, and Vietnam. SEANUTS II is a nationally representative cross sectional survey that aims to provide up-to-date and in-depth insights into the nutritional status, growth, and physical activity of more than 18,000 children between 6 months and 12 years old and also to explore other potential nutrition-related problems with a special focus on protein. Data collection will include anthropometric measurements, dietary intakes and habits, physical activity, fitness assessments, hematological and biochemical measurements (such as iron, vitamins A, and D). Data collection is planned for 2019–2020. SEANUTS II will provide invaluable data on current nutritional problems faced by children in 4 ASEAN countries. The findings will be of significant public health importance and the data obtained will serve as the foundation for future nutrition intervention strategies. The presentation will describe the design, justification, and methodology of SEANUTS II.

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Relation between Energy Consumption, Physical Activities and Overweight of Pupils in Bina Insani Bogor Elementary School

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Keywords: Energy consumption · Physical activities · Overweight · Pupils

Background/Aims: The general objective of this research was to study the level of energy consumption and analyze the factors linked to the overweight among the pupils of 'Bina Insani' Elementary School of Bogor. The specific objectives were to determine the prevalence of overweight among the pupils in the 'Bina Insani' Elementary School, to calculate the level of energy consumption among overweight and normal pupils, and to examine the physical activities of overweight and normal pupils during school days and holidays. **Methods:** This research was a cross sectional design, examining 60 pupils (30 overweight and 30 normal) randomly selected as samples. The statistical analyses in the research involved independent samples T-test and Pearson correlation. **Results:** The prevalence of overweight was 18.4%. The level of energy consumption was in the normal category (90–119% RDA), and there was no significant difference (p > 0.05) between overweight and normal children. The physical activity levels during school days were significantly different (p < 0.05) between light and moderate activities. Meanwhile, there was a significant difference in the activities during holidays (p < 0.05) such as learning activities, TV viewing, light activities, moderate activities and heavy activities between overweight and normal children. The Pearson correlation analysis showed that the energy consumptions on both school days and holidays positively related to overweight (BMI). **Conclusion:** Physical activity level was significantly associated with overweight

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Prevalence and Factors Affecting Hypertension in Rectorate of Bogor Agricultural University Employee

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Keywords: Employee · Hypertension · Risk factors

Background/Aims: Hypertension is another name for high blood pressure that can lead to severe complications and increases the risk of heart disease, stroke, and death. This research was aimed to study the risk factors of hypertension in Rectorate of Bogor Agricultural University Employee. **Methods:** The study design was cross sectional with 69 subjects. The subjects were employee who were willing to be respondent. Location of the study was selected purposively while subjects were selected by multistage cluster sampling. The research was conducted on February-May 2016. **Results:** Correlation test showed significant correlation between hypertension with age (p = 0.009; r = 0.313), sex (p = 0.031), history of family hypertension (p = 0.002; r = 0.369), and nutritional status (p = 0.016; r = 0.289). There was no significant relationship between hypertension with education level, smoking, physical activity, stress, work level, fat consumption pattern, salty and preserved food consumption pattern, and per-capita income (p > 0.05). Logistic regression showed the significant effects of overweight or obese (p = 0.001, OR = 32.0), male gender (p = 0.008, OR = 17.2), and history of family hypertension (p = 0.025, OR = 6.5). **Conclusion:** Being overweight or obese, male gender, and history of family hypertension could be the risk factors of hypertension in this study.

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Proper Meal and Protein Hierarchy: Understanding Protein Consumption in Indonesia

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Keywords: Proper meal · Protein hierarchy · Protein consumption · Qualitative study

Background/Aims: Protein consumption in Indonesia has been regarded as less satisfactory. This paper aimed to explore the reasons for protein consumption in Indonesia through people's understanding of proper meal and protein hierarchy. It is derived from the "Socio-Cultural Research in Protein Transition (SCRIPT) study", conducted using a qualitative study among adult males/females aged≥19 years in 3 purposively selected cities (Jakarta, Bali, Makassar) during December 2017-March 2018. **Methods:** Data were gathered from in-depth interviews among 28 informants with additional 3 key informants, preceded with 3 group discussions (attended by total 26 participants) among those varied in terms of gender, education level, age, ethnicity, religion, working status, marital status, and living arrangement. Pretested guide questions using a participatory approach (i.e. food ranking and pictures) were used to delineate the concepts under study. Thematic analysis was done to understand the phenomena. Five major themes were discussed, i.e. 1) Completeness of a meal, 2) Having a good meal, 3) Suitability with meal time, 4) Intention to fulfil the proper meal, 5) Protein ranking: preferences and actual consumption. **Results:** The findings suggest that people's understanding of the concepts were very much contextual depending on the prevailing norms that were related to foods commonly available in the area and practices commonly done. The actual consumption, on the other hand, was linked to the economic dimension, practicality, and palatability of the food. **Conclusion:** Our understanding of these concepts may help promote more varied sources of protein (both animal and plant-based) that address the availability-affordability.

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Integrated Nutrition Interventions Reduce Metabolic Syndrome: Study of Integrated Interventions by Diet, Behavior, Physical Activity on Overweight in Junior High School Children in Bandung City

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Keywords: Overweight · Obese · Middle school adolescents · Metabolic syndrome

Background/Aims: Overweight in adolescents is a global health problem. The prevalence of overweight among adolescents in West Java province was 7.5%. Overweight was caused by food intake, low physical activity, and adolescent behaviors. Overweight increased metabolic syndrome and non-communicable diseases and morbidity. The study explored the effect of integrated interventions by diet, behavior, physical activity on overweight adolescents in junior high school in urban Bandung. **Methods:** The study design was pretest-posttest randomized control trial among 88 overweight students. Students were grouped into different interventions, i.e. (1) diet, (2) physical activity, (3) integrated diet, behavior and physical activity, and (4) behavior. Data collected and measured were BMI, RLPP, and body weight by anthropometry. Blood pressure was measured by sphygmomanometer. Nutritional intake was measured by food recall questionnaire. Data were analyzed by MANOVA by significance level $p < 0.05$. **Results:** By the end of the study, there were a decreased in food intake such as energy, carbohydrates, fat, and protein. The prevalence of obese was 27.5% and of overweight 72.5% at baseline. At endline, the prevalence of obese was 22.0%, overweight 76.9% and normal 1.1% ($p = 0.054$). The hypertension was 12.1% then decreased to 4.4% and 2.2% had normal status. Systolic blood pressure was significantly decreased ($p = 0.001$). **Conclusion:** Interventions decreased body weight and systolic blood pressure, and improved nutritional status among adolescents.

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Pramenstrual Syndrome, Snack Food Consumption, and Physical Activitiy Among The Young Girls at 18th Middle School Medan City

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Keywords: Complementary feeding · Awak banana · Red bean · Herbal chicken feet

Background/Aims: Premenstrual syndrome (PMS) is a common of physical, emotional, and behavioral symptoms that occur in women of reproductive age. The cause of PMS is not known yet, but there are several factors that can affect PMS such as consuming junk food and less physical activity. The purpose of this study was to find out the description of consumption of snack food, physical activity, and PMS in young girls in SMP Negeri 18 Medan. **Methods:** This research was a descriptive study with cross sectional design. The sample size of this study were 63 young girls. The data about consumption of snack food was retrieved using a 24-hour food recall questionnaire, food frequency questionnaire and physical activity form using PAL. The used data analysis was univariate analysis. **Results:** The results of this study showed that all the young girls experienced the PMS. The consumption of snack food in the frequent category was 49.2% and the type of snack food that commonly consumed were fried food. The consumption of calcium, magnesium and vitamin B_6 were quite enough. The level of physical activity was fairly mild. There was a realtionship between the frequency of snack food consumption, and amount of calcium, magnesium and vitamin B_6 consumption with PMS (p value of each 0.01), and there was also a relationship between physical activity with PMS (p value 0.01). **Conclusion:** It can be concluded that reducing consumption of snack foods and increasing calcium, magnesium and vitamin B6 intake and increasing physical activity can reduce PMS the young girls.

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Use of Iodized Salt in Processed Foods Improves Effectiveness, Sustainability and Equity in Improving Iodine Nutrition: Experiences and Recommendations

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Keywords: Iodized salt · Processed foods · Iodine intake

Background/Aims: Salt iodization is a highly successful public nutrition intervention, significantly improving the intake of iodine and preventing deficiency. To date, salt fortification programs have focused primarily on iodization of household salt while little is known about the use of iodized salt in processed foods, and its potential contribution to iodine intake. **Methods:** Published and grey literature was reviewed to explore experiences with the use of iodized salt in processed foods. **Results:** Processed foods now provide the main source of salt intake in many countries. Use of iodized salt in processed foods is widely practiced and causes minimal organoleptic changes. Iodine retention varies significantly but is above 60% in the majority of foods. In countries with data on food consumption and salt content of processed foods, use of iodized salt could contribute a significant proportion of adult recommended intake for iodine. The majority of countries in Asia with mandatory salt iodization require use of iodized salt in food processing. Enforcement of this requirement is poor however, and information on compliance by salt and processed food manufacturers is lacking. **Conclusion:** Use of iodized salt in processed foods can be facilitated by clear and enabling legislation and regulations, effective enforcement to ensure fair competition, equivalent taxation levels for iodized and non-iodized salt, consumer-friendly ingredient labelling, and alignment between salt iodization and salt reduction initiatives. Requiring the use of iodized salt

in food processing would increase iodine intake and the sustainability and equity of national interventions to achieve optimal iodine nutrition.

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Has Asia Achieved Universal Salt Iodization and Eliminated Iodine Deficiency?

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Keywords: Iodine deficiency · Salt iodization · Fortification of salt

Background/Aims: Twenty-five years ago, "universal salt iodization" was adopted as the global strategy to prevent and treat iodine deficiency and it has been hailed as one of the most successful public health interventions. Globally, the majority of households are using iodized salt and the number of countries with suboptimal iodine intake has fallen dramatically. Asia is at the forefront of these achievements with UNICEF reporting that 91% and 87% of households in Southeast Asia and the Pacific, and South Asia respectively, are consuming iodized salt and only five countries in the regions have insufficient iodine intake. Success factors for these achievements include the enactment of mandatory legislation for salt iodization, commitment of and collaboration with the salt industry, and political commitment and adequate oversight, coordination and enforcement by the Government to ensure and maintain salt iodization. However, a number of countries continue to struggle to match these achievements and several have actually experienced a deterioration in salt iodization coverage or iodine intake. Additionally, the program context has changed in many countries as the salt industry has developed and diets have changed, with an increased proportion of salt consumed through processed foods and condiments, rather than through salt added directly at the table or during cooking. A brief historical overview of national salt iodization programs in Asia will be explored in this paper and recommendations will be ma.

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Association between Nutritional Knowledge and Diet Quality among High School Students in Depok, West Java

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Keywords: Adolescents · Nutrition · Diet quality · West Java

Background/Aims: Unhealthy practice of diet in adolescents was a problem that often occurred in both developed and developing countries. This study aimed to identify diet quality and its association with nutritional knowledge among high school students in Depok, West Java. **Methods:** A cross-sectional study was conducted among private and public high school students in Depok, West Java, in August – December 2018 using stratified random sampling. A total of 283 subjects, 113 males and 170 females aged 15–18 years, were selected randomly from the schools. Socioeconomic characteristics and nutritional knowledge were collected by structured interview. Dietary intake was obtained using 3-days repeated 24-hour recall. Diet quality was measured using Diet Quality Index-International (DQI-I) that focused on four major aspects of quality diet (variety, adequacy, moderation and overall balance). Chi-square was carried out to analyze the data, considered significant if p-value <0.05. **Results:** Median score of the population for DQI-I was 46 of possible score (100). Overall balance aspect was the lowest score, 2 of possible score (10). None of the students met 100% recommendation of fruit and vegetable adequacy. Chocolate milk bar, chips, carbonated beverages, energy drinks, sugary beverages, sweets, chocolate biscuits, instant coffee, *cilok* (flour dumpling), and *kerupuk* (traditional chips) were identified as empty calorie foods among the students. Poor nutritional knowledge (OR 1.66(1.02–2.70); p = 0.041) was significantly associated with lower diet quality score. **Conclusion:** Therefore, improving nutrition knowledge should be highlighted in order to increase diet quality of the high school students.

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Understanding Macronutrients, Fiber and Micronutrients Intake in Malaysian University Students: A Way of Improving Nutritional Outcomes

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Keywords: Anthropometric measurements · Macronutrients · Micronutrients · Malaysian

Background/Aims: The escalating prevalence of obesity necessitates the identification of modifiable nutrient factors in order to improve health status. Little is known, however, about the associations between anthropometric measurements and nutrient intakes among university students. This study aimed to determine the effect of nutrient intakes on anthropometric measurements among Malaysian university student. **Methods:** This cross sectional study was conducted among 411 students aged 18–29 years, purposively sampled from a private university in Klang Valley, Malaysia. Anthropometric data (weight, height, waist circumference, visceral fat and body fat percentage) were measured. Nutrient intakes were assessed by 3-day 24-hour diet recalls. **Results:** Students on average had adequate macronutrient intakes, however, total consumption of dietary fiber and micronutrients were fall short of recommended levels. Significant negative associations were found between body mass index (BMI) and all the macronutrients, calcium, thiamine, riboflavin and niacin intake. Body fat percentage was significantly associated with intakes of all the macronutrients, calcium, zinc, thiamine and niacin. Significant inverse associations were also found between waist circumference and intakes of carbohydrate, fiber, thiamine, riboflavin and niacin. Visceral fat showed significant inverse associations with intakes of carbohydrate, fat, fiber, thiamine, riboflavin and niacin. BMI was associated with niacin consumption ($\beta = -0.161$, $p = 0.027$) after adjusting for sex, gender and race. Body fat percentage was found significantly associated with niacin ($\beta = -0.180$, $p = 0.002$) and riboflavin ($\beta = -0.132$, $p = 0.014$). **Conclusion:** Macronutrients, fiber and micronutrients, especially B vitamins, improve the anthropometric measurements. This study highlights the importance of focusing on these nutrients when managing obesity among the university students

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Nutrients Intake and Nutritional Status of Under Five Years Old Children in Surabaya, Indonesia

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Keywords: Nutrients intake · Nutritional status · Under five years old · Children

Background/Aims: Children malnutrition is a serious problem in health and nutrition. Indonesia's children suffer both of under- nutrition and overnutrition problems, including in Surabaya. One of the causes of this nutritional problem is the intake of nutrients, both macro and micro nutrients. The purpose of this research was to analyze the correlation between nutrients intake and nutritional status among under-five years old children in Surabaya, Indonesia. **Methods:** A cross sectional study involving 448 samples of children in Surabaya selected by multistage random sampling was conducted. Nutrients intake assessed were energy, carbohydrate, protein, fat, calcium, iron, zinc, and vitamin A. The nutrient intake was measured by 24-hours food recall. Nutritional status of children were determined by Z-score used W/A, H/A, and W/H index. The data were analyzed by chi-square test. **Results:** There were significant correlation between carbohydrate, calcium, zinc, and vitamin A intake with W/A index ($p < 0.005$). There was significant correlation between calcium, iron, and vitamin A intake with H/A index ($p < 0.005$). There was significant correlation between calcium and zinc intake with W/H index ($p < 0.005$). **Conclusion:** Both macronutrients and micronutrients are important to support children's nutritional status and children's growth.

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Effectiveness of a School Vegetable Gardening Model in Improving the Nutritional Status of School Children in Laguna, Philippines

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Keywords: School · Vegetable gardening model · Project effectiveness

Background/Aims: The study aimed to address the problem of undernutrition among school children and the youth's declining interest in agriculture, SEAMEO-SEARCA partnered with the University of the Philippines Los Baños and the Department of Education Laguna to implement the School and Home Gardens Project. This study was conducted to assess the project's effectiveness in improving the nutritional status of school children six months after project implementation. **Methods:** Paired-sample t-tests were performed to compare the weight, height and body mass index (BMI) of children before and after project's implementation and between the pilot and control schools. Comparisons were undertaken to compare the weight. height, and BMI differences and rehabilitation rate between the pilot and control schools using t-test and Fisher exact test, respectively. **Results:** Significant differences were observed in all indicators between pre- and post-implementation in both pilot and control schools but there was no significant difference between schools. Significant difference in height difference in favor of the pilot schools was observed but not for weight and BMI. The result was not significant when the rela-

tion between the changes in the nutritional status prevalence were examined in the pilot and control schools. **Conclusion:** Despite significant improvements in anthropometric indicators between pre- and post-assessments, the evidences were not enough to claim that the project in pilot schools made a difference in rehabilitating wasted school children. Although wasting is an acute condition and short-term interventions would likely work, the duration of the project may be too short to calculate the immediate impact.

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Study on the Association of Iron Supplementation and Adverse Birth Outcomes in Northwestern China

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Keywords: Iron supplementation · Pregnant · Adverse birth outcomes

Background/Aims: The association between iron supplementation during pregnancy and the risk of adverse birth outcomes remains unclear. The purpose of this study is to explore the relationship between iron supplementation during pregnancy and birth outcomes in pregnant Chinese women. **Methods:** We utilized data from a large population-based cross-sectional epidemiological survey on birth outcomes and maternal nutrient supplementation in Shaanxi province, Northwest China. The participants were women who were pregnant between August 2011 and August 2013 and give birth at a gestational age ≥28 weeks. Multivariate logistic regression were performed to estimate the association between iron supplementation and the risk of adverse birth outcomes. **Results:** 29565 participants were available for analysis. The overall prevalence of iron supplementation during pregnancy was 13.1% and the overall prevalence of adverse birth outcomes was 11.8% in Shaanxi. The birth defect rate for the women with iron supplementation were lower than those without iron supplementation (OR = 0.72, 95% CI: 0.55–0.96). However, there was no significant decrease risk of low birth weight and preterm for women with iron supplementation. **Conclusion:** Optimal iron supplementation was associated with a decreased prevalence of birth defects. Our findings have important implications for birth defect intervention with iron supplementation for countries with high prevalence of birth defects.

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Total Energy and Macronutrient Intakes of Preconception Women in Banggai Regency, Central Sulawesi

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Keywords: Preconception woman · Macronutrient intake

Background/Aims: Macronutrient deficiencies in preconception women contribute to excess maternal and fetal complications during pregnancies. The objective of the study was to evaluate macronutrient intake in preconception women. **Methods:** Data from 132 preconception women aged 18–35 years old in three sub-districts of Banggai, were collected from October 2016 to February 2017. The estimated daily energy, carbohydrate, protein and fat intakes were compared with the Indonesian Recommended Dietary Allowances (RDA) for the appropriate age group (adequate > 80% RDA, and low <80% RDA). **Results:** The mean energy intake were 1514.3 kcal per day (+SD = 366.6); and 22% had adequate energy intake. The mean carbohydrate intake was 216.7 g per day (+SD = 65.6), and 25.8% had adequate carbohydrate intake. The mean protein intake was 56.4 g per day (+SD = 21.7), and 71.2% women had adequate protein intake. The mean fat intake was 45.5 g (+SD = 21.6), and 20.5% had adequate fat intake. **Conclusion:** Most women during preconception period did not have sufficient intake of energy, carbohydrate and fat. Preconception period is the best time for women to modify their dietary habits and select healthy nutritional patterns.

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Comparison Compliance Score between IFA and Multimicronutrient Supplementation since Preconception Period on the Fetus and Birth Length in Banggai Regency, Central Sulawesi

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Keywords: Iron folic acid · Multimicronutrient · Fetus measurements · Birth length

Background/Aims: The beneficial effects of multi micronutrient (MMN) and Iron Folic Acid (IFA) supplementation on preg-

nancy outcomes is still debatable. The objective of this study was to compare the compliance score between IFA and MMN supplementation since preconception until birth on the fetus and birth length. **Methods:** The research was conducted in three sub-districts of Banggai. A double blind study, randomized controlled trial, providing multimicronutrient for women from preconception period until birth using prospective design with saturated sampling technique. A total of 19 preconception women were followed-up during pregnancy until after giving birth. Enrollment was from September 2016 to January 2018. In the second and third trimester of pregnancy, fetal's head circumference (HC), bi-parietal diameter (BPD) and femur length (FL) were measured using ultrasound. Birth length was measured. **Results:** The mean±SD compliance score in the MMN group was 2.00 ± 0.21 and in IFA group 2.14 ± 0.24. In the 2nd trimester in IFA group, HC was 20.76 ± 0.76, BPD 5.69 ± 0.44 and FL 3.70 ± 0.20 and in MMN group, HC 21.69 ± 1.24, BPD 6.12 ± 0.34 and FL 4.18 ± 0.29. In the 3rd trimester of pregnancy in IFA group, HC was 30.55 ± 0.88, BPD 9.08 ± 0.15 and FL 6.53 ± 0.45, while in MMN group HC 30.56 ± 1.08, BPD 8.85 ± 0.35 and FL 6.61 ± 0.30. The average length of infants in IFA group was 47.86 cm and in MMN group was longer, 49.50 cm (p = 0.001). **Conclusion:** Pregnant women who get MMN intervention has a lower compliance score, but had infants with longer birth length.

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Behind the Low and High Coverage of Vitamin A Supplementation Program among Children 6–59 Months in Six Provinces of Indonesia

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Keywords: Vitamin A supplementation · Coverage · Program implementation
Background/Aims: The less optimum coverage of vitamin A supplementation (VAS) indicating many children were being missed, who were most likely those with greater risk of undernutrition. This study aimed to assess coverage of VAS and associated factors post the February 2017 round, and program implementation at provincial, district and primary health care level. **Methods:** The study consisted of a cross-sectional survey involving 5,400 caregivers of children aged 6–59 months, and qualitative approach to health providers and community health workers (CHW) in six provinces (North Sumatera, South Sumatera, Riau, Banten, West Java, West Nusa Tenggara). **Results:** In total, the VAS coverage was 80.3% (62.6–88.1%). After controlling for confounders, significant higher likelihood to receive the capsule were observed among caregivers with better knowledge on VAS, did more frequent visit to integrated health post (*Posyandu*), had CHW as main information source, need shorter time to reach *Posyandu*, had older child, ever read maternal and child health/KIA book, had higher income and living in rural. There were six highlighted findings from the qualitative approach, i.e. (1) VAS supplies were not a problem at all levels in all provinces, (2) need intensive promotion with repeated exposures, (3) use of projection data 'versus' real data for coverage calculation, (4) importance of data quality control (i.e. Quality Reporting System) to minimize report submission delay, (5) limited budget for sweeping in challenging areas, and (6) need to empower and maintain motivation of CHW. **Conclusion:** The coverage of VAS was relatively high but some challenges remained.

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Monitoring of the Scale-Up Program on Zinc and Oral Rehydration Solution for Childhood Diarrhea Treatment in Three Provinces in Indonesia

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Keywords: Childhood diarrhea · Zinc · Oral rehydration solution
Background/Aims: Experts recommend use of zinc salt along with oral rehydration solution (ORS) as diarrhea treatment for young children. The study aimed to estimate coverage and adherence of using zinc and ORS during diarrhea episodes of the children, and diarrhea-related services provided. **Methods:** The data was collected in December 2017-January 2018 in three provinces (Banten, West Java, West Nusa Tenggara), involving 1,121 caregivers of child aged 6–59 months suffered from diarrhea for the past one month. Also, 113 physicians and 270 midwives were interviewed. **Results:** Nearly 95% caregivers ever heard diarrhea and ORS, but not zinc (36.4%). Caregivers' knowledge on childhood diarrhea and its management was low (6.6% caregivers correctly answered ≥80% questions and 42.5% for ≥50% questions), particularly on the use of both ORS and zinc. Despite <10% health providers reported stock out of ORS and/or zinc, only 55.4% and 45.5% caregivers were suggested to give ORS and zinc to the child, respectively, by the health providers. Among those who went to public health services, 66% caregivers received ORS, 33.4% received zinc, and 23.7% received zinc and ORS. Unfortunately, only 4.6% children received full course of zinc and ORS as recommended. Among the interviewed health workers, only 21.6% had ever heard *Lintas Diare* (the government's strategy to manage diarrhea), and nearly one-third had moderate-good knowledge on childhood diarrhea treatment. **Conclusion:** In addition to diarrhea prevention pro-

motion, the findings urged an intensive socialization and training for health providers and massive campaign to caregivers on childhood diarrhea treatment.

1107

Menopause as Major Risk Factor of Hypertension among Women Age >45 Years Old in Cipayung, Depok Indonesia

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Keywords: Hypertension · Menopause · Elderly women

Background/Aims: Hypertension is one of main causes of death in Indonesia and known as *silent killer*. Hypertension could lead to heart attack, stroke, and kidney disease. With increasing age, the risk of hypertension would also be increased. This study aimed at better understanding on risk factors of hypertension among >45 years old women. **Methods:** Study location was in elderly integrated post (*Posbindu*) in Cipayung, Depok. A cross sectional study was conducted in November 2016-January 2017 with 381 subjects chosen purposively. Data were collected through relevant measurement devices and through questionnaire. Variables included were age, menopausal state, working status, education level, waist circumference, nutrition status, blood cholesterol level, blood uric acid level, blood glucose level, physical activity, stress level, and energy and protein intakes. Data were then analyzed using chi-square and logistic regression. **Results:** The results showed that the prevalence of hypertension among subjects was very high i.e. 75.1%. Interestingly, multivariate analysis reveals that the only factor related significantly with hypertension was menopausal status (OR 2.7 CI:1.5–5.1). **Conclusion:** Menopause women are more susceptible toward hypertension. More researches are needed in this area to prepare for a better post-menopausal life.

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Biennial Nutrition Surveys of Children in Refugee Camps along the Thailand-Myanmar Border

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Keywords: Nutrition survey · Refugee · Thailand · Myanmar · Children

Background/Aims: Biennial nutrition surveys are conducted in the 9 camps situated along the Thailand/Myanmar border to estimate prevalence and examine trends in acute and chronic malnutrition; Infant and Young Child Feeding (IYCF) practices; and household hunger. **Methods:** TBC and health agency partners (IRC and MI) conducted nutrition surveys of children 6–59 months (n = 3,905) in these camps May-September 2017. Random sampling was used to select households with children using TBC's Total Population Database. TBC trained and supervised health agencies and ethnic health departments in survey implementation. The WHO Growth Standards were used to analyze anthropometric data which were presented by prevalence. **Results:** 2.1% of children surveyed were wasted (global acute malnutrition), considered as an "acceptable" level (WHO). Wasting has remained unchanged since 2011. Although stunting prevalence was "high" (WHO) at 31.8% (range 18.8%-41.7%), there has been significant progress with a 9.0% reduction (2013–2017). The rate of mothers of children 6–24 months who reported they were not currently breastfeeding (17.3%) reduced by ~2.0% since 2015, while almost 4% fewer mothers reported feeding their child's first meal before 6 months of age (20.1%). Finally, 97.7%, 2.2% and 0.1% reported little to no hunger, moderate, and severe household hunger, respectively (2017), much reduced since 2015 when 77.0%, 21.3% and 1.7% reported little to no hunger, moderate hunger and severe hunger, respectively. **Conclusion:** While stunting remains a challenge in the 9 border camps, there is a downward trend showing continued progress since 2013. Therefore, supporting recommended IYCF practices in innovative ways remains a priority.

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Difference in Level of Physical Activity and Nutrient Intake in Diabetic and Non-Diabetic People in Bangladesh

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Keywords: T2 diabetes · Physical activity · Dietary pattern · Bangladesh

Background/Aims: Type 2 diabetes (T2D) is a leading cause of morbidity and a major economic burden of Bangladesh. T2D is increasing globally and several risk factors have been identified that contribute to T2D including the availability of calorie-rich foods and sedentary lifestyle habits. However, no study has identified nutrient intake and physical activity level on T2D patients simultaneously in Bangladesh for person with and without T2D. Thus, the objective of the study is to investigate the nutrient intake and physical activity levels of people with and without T2D in Bangladesh. **Methods:** The Nutrition, Health and Demographic Survey of Bangladesh, 2013 data has been used for this study. The survey was conducted over 6,274 households comprising of 31,066 samples. Among these, 850 subjects (520 men and 330 women) had data on fasting blood glucose (FBG) level which constitute this study samples. **Results:** The results (unweighted) showed that 28% of the men and 28.9% of the women aged 30 years or more had

T2D (FBG ≥7.0 mmol/L), and the difference was not statistically significant between men and women. About 8.4% of the T2D patients (n = 250) had sedentary or low level of physical activity (PAL <1.70) whereas for non-diabetic patient 10% (n = 80). Average energy, protein, carbohydrate, fat, iron, zinc, and calcium intake were not significantly different between the T2D and non-diabetic subjects. However, overall majority of the subjects were not meeting estimated average requirements of macro and micronutrients. **Conclusion:** This study recommends dietary and life-style related nutrition interventions for Bangladeshi population.

1110
Relationship between Breakfast Habits and Sleep Duration and Academic Achievement of Elementary School Children

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Keywords: Breakfast habits · Sleep duration · Academic achievement

Background/Aims: Skipping breakfast and unqualified of daytime sleep has been associated with an adverse effect on the academic performance of elementary school children (ESC). The objective of this study was to analyze relationship between breakfast habits and sleep duration with academic achievement of ESC. The design of this study was the cross-sectional. **Methods:** The study was conducted in South Jakarta in two elementary schools (SD), namely SDN Pesanggrahan 02 Pagi and SDN Pesanggrahan 08 Petang. Samples of this study were the fifth grade of ESC. Numbers of the sample were 105. Data collection was applied by using a questionnaire. **Results:** The result showed that the frequency of skipping breakfast was 0% at SDN 02 Pagi and 1.96% at SDN 08 Petang. The average total sleep duration of ESC is 9.62 hours ± 0.92. ESC, who slept 9 hours/day in SDN 02 Pagi was 9.26%, while in SDN 08 Petang was 31.37%. ESC achievement was measured from the 1-semester standardized raw score of three subjects, namely mathematics, science, and English. The overall score of the three subjects was 71.82 ± 10.06 and when compared to elementary school, the academic achievement of SDN 08 Petang students was better than SDN 02 Pagi. If distinguished by the school, the value of mathematics subjects was significant (p < 0.05) higher for SDN 08 Petang students than SDN 02 Pagi (p-value <0.05, r = 0.302). **Conclusion:** There was positive correlation between daytime sleep duration and Math score.

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Investigation of The Effects of Microflora on Exercise Physiological Adaption, Performance, and Energy Utilization Using a Gnotobiotic Animal Model

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Keywords: Gnotobiote · Exercise · Energy availability · Physiological adaption

Background/Aims: The wide diversity in gut microbiota that is found among individuals is affected by factors including environment, genetics, dietary habits, and lifestyle after birth. Gut microbiota acts as "metabolic organ" that interacts with the human host symbiotically and performs an important role in maintaining health. Therefore, the purpose of this study is to understand the effects of several microflorae on physical fitness, exercise performance, energy metabolism, and biochemistries using the concept of gnotobiote based on a germ-free model. **Methods:** The microbes *Eubacterium rectale*, *Lactobacillus plantarum* TWK10, and *Clostridium coccoides* were separately inoculated into gnotobiotic animal models. Fecal analysis was regularly done for the entire duration of the experiment. The exercise capacities were measured repeatedly with and without aerobic exercise training using an exhaustive swimming test, Various fatigue-associated biochemical variables, In addition, metabolic phenotype was applied to record basal metabolic rate, diet, behavior, and activities. T Body composition, glycogen content, and histopathology were further evaluated to assess the gnotobiotic effects. **Results:** *E. rectale* engendered capacities, physiological adaption, and physical activities that were significantly better than other microbiota, possible due to energy regulation and bioavailability. In addition, *L. plantarum* TWK10 and *C. coccoides* were found to significantly increase the basal metabolic rate and to alter the body compositions, although no exercise capacity benefit was found in the gnotobiotic models. **Conclusion:** The *E. rectale* and L. *plantarum* gnotobiotic animals all showed normal histological observations with the exception of the C. coccoides gnotobiote, which showed an elevated liver risk.

1112

Capacity Building for Young Nutrition Leader to Improve Leadership Skill: Lesson Learn from Indonesian Young Nutrition Leaders Camp (IYNLC) 2018

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Keywords: Nutrition leadership · Public health nutrition · Capacity building

Background/Aims: Nutrition problems in Indonesia are complex. Solving nutrition problems in the community requires a specific (contribute 30%) and sensitive (70%) approach. The intended capabilities include self-awareness, problem-solving and decision making skills, communication skills, networking, team-working, influential skills. This skills is needed to solving nutrition and food problems in Indonesia. There are three objectives of the nutrition leadership training, 1) Enhancing the leadership capacity of young people with nutrition and food that have the potential, 2) Creating a transfer of experience and exemplary character from the leadership of government institutions, corporate leaders, NGOs and senior experts in the field of nutrition and food to the young generation, 3) Facilitate the formation of networking among young people of nutrition and food. **Methods:** Nutrition Leadership Training held for 4 days. The participants were 35 young nutritionists from various regions in Indonesia. Training is provided with various **methods:** case studies, discussions, lectures and games. The training session was also given inspiration sessions by presenting leaders related to nutrition and food, from government, academia and industry. **Results:** This activity successfully inspired young nutritionists. In addition, it increases motivation in developing good abilities, nutritional abilities and leadership. From the evaluation it was found that most of the participants were satisfied with this activity. The speakers presented were also able to provide various kinds of new insights and inspiration for participants. **Conclusion:** It is recommended to have a long-term evaluation that looks at the impact of the aspects of application of leadership skills in their respective positions or workplaces.

1113

Anemia, Nutritional Status, and Risk of Eating Disorder among Women Students in College of Health Sciences (STIKes) Mitra Keluarga

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Keywords: Anemia · Adolescent nutrition · Eating disorder

Background/Aims: Anemia is a public health nutrition problem. Women and children are population at risk of anemia. In 2013 the proportion of anemia in Indonesia was 21.7 percent. Anemia can be caused by many factors one of which is the consumption pattern. Anemia in adolescent girls and women of reproductive age can cause problem in the first 1,000 days of life. This study aimed to assess anemia status, nutritional status and risk of eating disorders in female students in Mitra Keluarga School of Health Sciences. **Methods:** This study was designed with cross sectional design with a total sample of 97 girls in their first grade (semester). Anemia was taken from student' medical check-up data. Nutritional status was determined by measuring weight, height, and body mass index (BMI) by age; while risk of eating disorders using questionnaires Eating Attitudes Test (EAT-26). Data was analyzed by chi square test using SPSS. **Results:** The prevalence of anemia was 19%, of overweight 19% and of high risk of eating disorders 5%. There was no relationship between anemia and risk of eating disorders; but 40% of anemic students had high risk of eating disorders. **Conclusion:** Further research is needed to assess the type of risk of eating disorders, thereby determining which risks have a major effect on the incidence of anemia

1114

Nutrition and Lifestyle Behavior Peer Support for Malaysian Adults with Metabolic Syndrome (PERSUADE); A Process Evaluation

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Keywords: Metabolic syndrome · Nutrition · Lifestyle intervention · Health Belief Model · Process evaluation

Background/Aims: Metabolic Syndrome (MetS) is a pressing health issue in Malaysia and there is an urgent need to improve overall prevention and management steps. Although lifestyle intervention is commonly prescribed to solve MetS, only a few successful interventional studies have been reported effective and sustainable. We describe the development, implementation, and process evaluation of a community-based nutrition and lifestyle behavior peer support program (PERSUADE) for Malaysian adults with MetS. **Methods: Conclusion:** Relevant behavioral goals included in the peer module were first identified through a systematic review of literature and guidelines as well as findings from focus group discussion. Eventually, the overall module content and delivery was constructed based Health Belief Model. Finally, the effectiveness of PERSUADE was tested through a pre-post trial to promote nutrition and lifestyle behavior change in adults with MetS. The participants (n = 58) formed 4 peer groups lead by one leader for 3 months. Process evaluation in the form of intervention adherence and program reception were conducted at post intervention. **Results:** The response rate for the process evaluation was 90%. On average, each participant attended 83% of the planned session. The participants' content satisfaction was high while acceptability score was satisfactory. The primary outcome of the trial, changes in fasting blood glucose level was correlated with participants' satisfaction (r = 0.825, p < 0.001) and acceptability (r = 0.795, p < 0.001). The process evaluation of PERSUADE demonstrates its feasibility, and future studies should identify the possibility of extending the use of peer-based intervention programs to other health behaviors and nutrition and lifestyle behavior-related issues.

1115

Correlations between Consumption Patterns and Hemoglobin Levels in Pregnant Women in Manado City

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Keywords: Consumption pattern · Haemoglobin · Pregnant · Manado

Background/Aims: Anemia characterized by a decrease in the quantity of red blood cells is often associated with hemoglobin levels or morphological disorders of red blood cells. This study aimed to analyze the relationship between consumption patterns and hemoglobin levels of pregnant women in the city of Manado. **Methods:** This study was an observational study with a cross-sectional approach. The population in this study were all pregnant women who were enrolled in 5 health centers in the city of Manado. The sampling method was purposive sampling where the study sample was all pregnant women who were present at the Puskesmas and were willing to be respondents during the interim research period from April to July 2018. The samples in this study were 44 pregnant women. Data was collected using a structured questionnaire including using the Food Frequency Questionnaire, and taking blood samples from pregnant women to determine hemoglobin levels. **Results:** Based on the results of the study, 10 pregnant women (22.7%) had anemia, 35 pregnant women (79.5%) predominantly consumed carbohydrate as the main menu composition and 23 pregnant women (52.3%) consumed heme protein in their menu. This study concluded that the prevalence of anemia of 22.7% was considered as a public health problem. **Conclusion:** The consumption pattern in pregnant women has a correlation with the prevalence of anemia in pregnant women in Manado city.

1116

Effective Public Health Nutrition Improvement by Innovative Community Based Approach

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Keywords: Innovative community-based approach · Community health · Public health nutrition

Background/Aims: Vietnam achieved high economic growth lately and people's living standard has been rapidly improved, while ethnic minority groups of mountainous and highland areas are still left behind with almost 50 per cent of them living under poverty line and being threatened by high ratio of malnourished. Kon Tum is a province in central highland of Vietnam which experiences the highest child malnutrition rate among all 63 provinces and cities. **Methods:** In 2012, to combat this incongruous situation, the Foundation for International Development/Relief (FIDR), a Japan-based Non-Governmental Organization, launched a project to improve child nutrition based on Integrated Community-based Approaches by building community health network with local health volunteers and key mothers who connect mothers in the community. **Results:** After 6 years' effort, nutrition status of children was improved, in which the prevalence of underweight was reduced from 24.9% to 15.32%, and the rate of stunting was decreased from 52.3% to 26.73%. Moreover, the involvement of family members such as husbands and grandparents in child care increased compared to before, from 29.2% to 40.45% and from 28.3% to 42.3% respectively. Besides, there were positive changes in socio-economic situation, such as improved hygienic latrines build by the unique idea of households and diversified vegetable gardens which varied their meal options. **Conclusion:** In conclusion, it was recognized that, the remarkable result to the public health nutrition is observed when people understand the importance of the hygiene of living environment and the involvement of family members and community, not focusing on the nutrition improvement activities only.

1117

Progress of Vietnam Nutrition System Establishment Project (VINEP)

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Keywords: Vietnam Nutrition, clinical nutrition field, national nutrition system, VINEP

Background/Aims: VINEP, which started in 2011 by the agreement between NIN Vietnam and Japanese experts of nutrition and dietetics from JDA, aims to investigate, in light of the realities of Vietnam, the best ways to train and license dietitians, who play an important role in improving the country's nutrition and providing citizens with accurate information on nutrition and food hygiene. It also aims to contribute to improving the health of all Vietnamese through establishment of the national nutrition system. VINEP has 3 steps strategy; Step 1: Establish and Expand Nutrition education system; Step 2: Establish Nutrition-related regulations and Nutrition Standards; Step 3: Instill Nutrition Standards nationwide to create jobs for dietitians and to contribute to national health. Up until now, VINEP has made achievements such as; 2013:Started the 1st nutrition bachelor course in Hanoi Medical University. 2015:Enactment of Job Code (legal professional status) for dietitians. 2017: 43 dietitians graduated for the 1st time in Vietnam. 2018: Started to publish textbooks series for dietitian (NIN and TAF). In order to establish Nutrition Standards, we are currently focusing on clinical nutrition field and are collaborating with Japan Dietetic Association and leading Japanese institutions like Kyoto University Hospital, Kanazawa Gakuin University and Kyoto Women's University, where Vietnamese young nutrition leaders are trained as interns every year since 2017. In 2019, VINEP will enter the new stage of Step 3.

1118

Association Between Nutrient Intake and Nutrition Status and Quality of Life of Integrated Service Post (POSYANDU) Elderly Participants at District of Sleman

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Keywords: Nutrient intake · Nutrition status · QL · Elderly
Background/Aims: Elderly people are susceptible to undernourishment such as chronic energy deficiency, anemia, and lack of micronutrients. District of Sleman has the highest life expectancy in Indonesia. Increasing life expectancy should not cause declining quality of life (QL), thus programs of elderly empowerment are initiated to improve both QL and health status. Association between nutrient intake and nutrition status and QL of Posyandu elderly participants. **Method:** Study was observational with cross sectional design. Samples consisted of 310 elderly people of 60–74 years old. Nutrient intake were interview using FFQ and nutrition status from anthropometric assessment. QL was assessed based on questions in SF 36 Questionnaires. Analysis used bivariate and multiple logistic regression. **Result:** Significant association between nutrient intake and nutrient status based on body mass index that is energy RP 0.97; 95% CI 0.58–0.58; p = 0.01, protein RP 0.97; 95% CI 0.58–0.58; p = 0.01, fat RP 0.97; 95% CI 0.58–0.58; p = 0.01 and carbohydrate RP 0.97; 95% CI 0.58–0.58; p = 0.01. Nutritional status, marital status, gender, and age was significant with quality of life (p < 0.05). Multivariate test statistically nutritional status association with QL and age insignificant association with QL. **Conclusion:** Nutritional status, intake carbohydrate, marital status, gender were risk factors affecting QL of Posyandu elderly participants.

1119

The Effect of Addition of Vitamin C 50 Mg to Blood Added Tablet (Fe) on Increasing Concentration of Hemoglobin in Youth Princess

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Keywords: Teenagers · Vitamin C · Fe Tablets · Hemoglobin · Anemia
Background/Aims: Teenagers are the transition stage towards adults whose growth is related to nutritional fulfillment status, one of which is iron consumption. Lack of iron consumption causes anemia in teenagers. This study aims to determine the effect of the addition of vitamin C 50 mg on the consumption of tablets added blood (Fe) to the increase in hemoglobin concentration in young women. *Method:* This type of research is analytic observational research using a case control study approach, with a sample of 52 people. *Result:* The results of this study indicate that there is an increase in hemoglobin concentration in both treatment groups. The increase in hemoglobin concentration in the Fe + Vitamin C group was higher than in the Fe group, which was 2.34 g/dl (27.4%), whereas in the Fe group it increased only 1.04 g/dl (10.7%). Blood-added tablets if combined with vitamin C are more effective in increasing hemoglobin concentration in reducing the prevalence of anemia. **Conclusion:** The results of this study are expected to be used as a source of information in providing nutritional services to anemic patients, especially young women.

1120

Teachers' Perception on the Implementation of School Health and Nutrition Programs in Sri Lanka

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Keywords: School health and nutrition programs · Challenges · Barriers · Perceptions
Background/Aims: A comprehensive school health and nutrition programs (SHNP) can address various issues pertaining to school age children. Nutrition assessment, micronutrient supplementation, school gardening, school health clubs, physical activity program, water, sanitation and hygiene (WASH) and school canteen and healthy school environment are the major SHNP conducted in Sri Lanka. A qualitative study was conducted to evaluate the perception of school teachers and other stakeholders regarding achieving the objectives and to identify the most significant challenges and barriers of SHNP. **Methods:** Focus group discussions, semi structured interviews and direct observations were conducted in thirteen schools. All the data were transcribed to English and the transcriptions were analyzed according to a coding system using NVivo10. **Results:** Lack of participation of parents, operational defects, lack of staff and time, poor attitudes, lack of facilities and poor facility maintenance were the most significant challenges. Lack of consistency, lack of support, enthusiasm, advertency and poor coordination were the barriers identified. Poor monitoring and inconsistency of the programs were identified as the drawbacks. Nutrition assessment was given minimum attention in school medical inspection. School gardening was fairly implemented in schools although expected objectives were not met. School health club was weakly organized. Due to lack of the proper coordination and commitment of relevant stakeholders hindered the expected objectives. Concerted effort of resource persons was required to intensify awareness programs on health and nutrition. **Conclusion:** The implementation of SHNP should be strengthened through monitoring and proper coordination at the management and implementation level.

1121

Effectiveness of Nutritional Education with The Group Approach and Empowerment of Social Groups Improve Diet Compliance in Adult Women with Obesity in Denpasar

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Keywords: Nutrition education, Group, Empowerment, Diet compliance

Backround/Aims: Obesity is a global problem whose prevalence is increasing every year. Obesity raises a variety of health problems so one of them must be overcome with the right diet through nutrition education. The study aims to determine the effectiveness of nutritional education with a group approach and empowerment of social groups in increasing dietary compliance and in obese adult women. **Methods:** The study was an experimental study with a pre-test post-test control group design. Subjects were adult women in Denpasar City with a body mass index of >25 kg/m2. The subjects were divided into two groups with randomization. The treatment group received nutritional education with the group method and social group empowerment and control with conventional methods. The effect of treatment was analyzed by T-Test, Dependent-Test, and analysis of covariance. **Results:** The number of subjects was 54 people in the treatment group and 54 control groups. There was a significant difference in the mean value of knowledge, diet compliance, intake and weight in the treatment and control groups after treatment (p < 0.05). The mean value before treatment in the treatment group was knowledge 68.53, diet compliance 68.65, energy intake 1916.4 Kal and body weight 68.01 kg. Dependent t-Test analysis showed significant changes after being given treatment ie knowledge increased to 76.9, diet compliance 78.42, energy intake dropped to 1555.0 Kal/day and BB 65.50 kg. Analysis of covariance also showed that giving treatment had a dominant influence on increasing dietary adherence (p < 0.05). **Conclusion:** Nutritional education with a group approach and empowerment of PKK social groups is effective in increasing dietary compliance in obese adult women.

1122

Analysis of an Oral Health Report from Dietitians Dispatched to the Areas Affected by the Great East Japan Earthquake

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Keywords: Disaster · Swallowing · Chewing · Stomatitis · Nutrition

Background/Aims: We analyzed an oral health report from dietitians dispatched to the areas affected by the Great East Japan Earthquake in order to clarify specific oral health problems after the disaster. **Methods:** This study extracted the issues regarding oral health from the free description of responses of 602 dispatched dietitians by using key words. The key words for the first textual search were chosen from a standard oral health assessment sheet and other materials. Secondary key words for the second textual search were selected from the results of the first textual search. The free descriptions extracted from the first and second textual searches were categorized into similar groups and labeled by the KJ method. **Results:** Oral health issues were classified into four categories: "difficulty of swallowing," "difficulty of chewing," "environmental degradation," and "degradation of oral condition." Difficulty of swallowing included "needs for soft meals by dysphagia," "needs for thickening agent by choking," and "aspiration." difficulty of chewing included "needs for chopped meals due to reduced mastication" and "degradation of dietary intake by loss of denture." Environmental degradation included "overeating of snacks / increase of dental caries and obesity" and "impossibility of brushing teeth." Degradation of oral condition included "stomatitis" and "sputum production and dry mouth." **Conclusion:** These results suggest that an oral health support system is necessary for eating assistance during disasters. Health professionals should focus on oral health and enhance the cooperation between other fields for future disasters.

1123

Correlation of Food Consumption and Nutritional Status with Cardiorespiratory Endurance of Sandiman Training Participants in Sandi Negara Institution, Bogor

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Keywords: Cardiorespiratory endurance · Food consumption · Nutritional status

Background/Aims: Cardiovascular endurance is a must have components of fitness *Sandiman* training participants in running education and *Sandiman* training. This component can support learning and physical activity of *Sandiman* training participants. This study was aimed to analyze the correlation between food consumption and nutritional status with cardiorespiratory endurance *Sandiman* training participants in Sandi Negara Institution. **Methods:** A cross sectional study of 50 people was conducted. **Results:** The study showed that there was significant correlation (p < 0.05) between nutritional status and cardiorespiratory endurance of subject. There was no significant correlation(p > 0.05) between adequacy levels of energy, protein, fat, carbohydrate, and dietary fiber with cardiorespiratory endurance of subject. **Conclusion:** Nutritional status of Sandiman was positively correlated with the cardiorespiratory fitness.

1124

Health Seeking Behavior in Sundanese and Minang Women with Hypertension in Rural Areas

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Keywords: Hypertension · Health seeking behavior · Sundanese · Minang ethnicity · Women

Background/Aims: Riskesdas-2013 noted that the prevalence of national hypertension in Indonesia reached 25.8%. The low level of blood pressure control of people with hypertension and the delay in seeking treatment (Health Seeking Behavior) can increase mortality. **Methods:** The method in this study was cross sectional in Purwakarta, West Java and Pariaman, West Sumatra. In each district there are 75 people each sample women aged 35–55 years with systolic blood pressure >120 mm Hg and diastole >90 mm Hg. Statistical analysis using Pearson Chi-Square. **Results:** The results show that Sundanese respondents can access health facilities such as Public Health Centers, doctors' clinics, posyandu, midwives and traditional clinics, while there are no traditional clinics for Minang respondents. Public Health Centers became health facilities chosen by respondents both Sundanese and Minang (62.7% and 64.0% respectively). There is a difference in the selection of a doctor's clinic as a place of treatment. Sundanese respondents significantly use doctor's clinic more than Minang respondents (p-value <0.05). To control blood pressure, most Sundanese respondents significantly changed their behavior by taking antihypertensive drugs and losing weight compared to Minang respondents (p < 0.05). Minang respondents tend to reduce salt consumption, although statistically the number is not significant. **Conclusion:** The conclusion was most respondents in two regions chose the Public Health Center as a place for treatment and medical related to their hypertension. However, changes in the health behavior of Sundanese people prefer to take drugs and weight lose, while the Minang people tend to reduce salt consumption.

1125

Knowledge of Nutrition and Nutritional Status of Kindergarten Children

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Keywords: Nutritional status · Knowledge · Kindergarten child · Fruit and vegetable

Background/Aims: Nutrition education plays an important role in consumption of vegetables and fruits so that the nutritional needs of vitamins and minerals are met. The purpose of the study was to measure the nutrition knowledge on vegetable and fruit consumption and healthy and clean lifestyle after nutrition education. **Methods:** The research design was quasi-experimental study with pre- and post-test. The research respondents were kindergar-ten children aged 4–6 years from 11 kindergartens in 11 sub-districts in Depok City. Interventions was given using poster media, leaflets, card games and booklets about vegetables and fruit and healthy and clean lifestyle. Nutrition education was given once with a duration of approximately 25 minutes. There were 340 respondents, 49.1% males and 50.9% females. **Results:** The most frequently consumed vegetables and fruit were spinach, kale, carrots and bananas. The proportions of subjects with low knowledge on health and clean lifestyle was 15%, with low knowledge of vegetables was 11.8% and of fruit 13.2%. After education, the increment on the knowledge on healthy and clean lifestyle, on vegetable consumption and on fruit consumption were 5.3%, 2.9% and 6.2% respectively. The prevalence of underweight was 7.6% and of wasting 5.9%. **Conclusion:** There was a modest increment in the knowledge about healthy and clean lifestyle and consumption of vegetable and fruit after education.

1126

Effectiveness of Dietary Intervention and Peer-Support Home Blood Pressure Monitoring in the Management of Hypertension among Low-Income Population in Urban Area

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Keywords: Hypertension · Dietary intervention · Blood pressure monitoring · Peer-support · Sodium

Backround/Aims: The objective was to assess the effectiveness of the dietary intervention and a peer-support home blood pressure monitoring program on the blood pressure, nutritional intake and blood profiles of hypertension patients in a low-income urban community setting. **Methods:** This was a community-based intervention involving low-income community living in community housing projects in urban areas within Kuala Lumpur, Malaysia. This study was conducted in 2013, among residents aged 18 years and above that has been diagnosed with hypertension by medical practitioners. The participants selected were those who received interventions on peer-support home blood pressure measurement, a series of talks on dietary intake modification and exercise demonstration for the first six months and another six months of maintenance phase where they only receive pamphlets and SMS reminder. The assessments were conducted at baseline, 6-month and 12-months of intervention consisting of anthropometric measurements, blood pressure and blood samples as well as undergoing a dietary assessment. **Results:** Macronutrients and micronutrients showed a significant improvement after the 12-month dietary intervention. The energy, carbohydrate, protein, fat, sodium, and potassium are showing significant reduction from baseline to end of 12-months intervention. Fasting blood glucose, renal sodium, triglyceride, LDL-C and HDL-C showed a significant improvement, after controlling for age and reported physical activity. **Conclusion:** This study has shown that dietary intervention, together

with peer-support home blood pressure monitoring, shown positive outcome and can be applied to low-income community setting in order to control and manage the hypertension.

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Urbanization and the Double Burden: Trends and Inequalities in Under- and Over-Nutrition by Residence and Wealth in India

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Keywords: Urban · Underweight · Overweight · Double burden of malnutrition

Background/Aims: By 2030, 40% of Indians will live in urban areas. We examined trends and inequities in the double burden of malnutrition in India using two rounds of National Family Health Survey data (2006 and 2016). **Methods:** Residence was categorized as rural (RUR), urban non-slum (U-NS) and urban slum (U-SL). Multivariate regression and inequality were used for statistical analyses. **Results:** Among children, growth faltering was most rapid in RUR areas, followed by U-SL and U-NS areas. Boys and girls were equally stunted (48% in 2006 to 38% in 2016) or overweight (7–8% at both times). Socio-economic status (SES) gaps were large for undernutrition, small for overnutrition, and did not change over time. Among adults, underweight decreased equally across residential areas (4–5%) to reach 20% on average in both men and women. Overweight increased more rapidly in RUR areas (7–9%) compared to U-SL (4–6%) and U-NS (1–3%) areas, reaching ~20%. The SES gap for underweight was narrower in 2016 than in 2006, mainly due to improvements among the poor. Overweight prevalence increased in all SES quintiles. **Conclusion:** The double burden of malnutrition is now a reality among adults in India. Although undernutrition has been reduced in both rural and urban areas over the past decade, the rate of increase in overweight was much larger in rural compared to urban areas, especially in slums. A further examination of changing living conditions, food environments, and physical activity levels is needed to identify and address the causes for these rapid changes in nutrition outcomes.

1128

School Feeding in Mongolia: Current Situation and Future Plan

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Keywords: Nutrition · School lunch · Children's health · Nutrition education

Background/Aims: This paper provides the background of School meal service in Mongolia and main activity in the future. Mongolia have named last nomadic country in the world. In this
case, every school, which located in countryside has a dormitory and many children live separately from parents. According to the recommendation of School meal service, the school dormitory serves a meal three times a daily. Nevertheless, most of children who do not live in dormitory do not have any meal service. In other words, school lunch program, which is one of famous welfare program in the world, has not been implement in Mongolia. From 2006 year, school snack program has been implemented in the whole the country. Only primary schoolchildren are participating in this program under the Government promotion. Children's health and nutrition behavior, micronutrient deficiency, malnutrition and other problems do not decrease. In addition, children's obesity increased in signaled level. The increased obesity among children is directly associated with inappropriate dietary habits such as skipping breakfast, excessive intake of fat, sugar and fast food consumption. Moreover, it is strongly related with nutrition education knowledge of the children and their parents. Under this circumstances, the "School lunch act" will been enacted by the Mongolian Parliament in this year, which is the first law on nutrition education. In modern view, nutrition education program is one of good way to improve dietary quality of the population. These approaches not only can promote one's good health and development, but also secure food security and safety in the whole country.

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Nutritional Status of Children with Developmental Disabilities of Secondary School in Ulan Bator City

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Keywords: Children · School · Nutritional status · Developmental disability

Background/Aims: Results from health statistics and national nutritional surveys showed that children with developmental disabilities including those with intellectual and movement disabilities increased among the population. The objective of this paper was to assess the nutritional and bone health status of developmental disabilities children who are studying in secondary school in capital city of Mongolia. **Methods:** The study conducted with 134 children with developmental disabilities between the ages of 9–18 who attended the especially secondary school. The following variables were determined such as body weight and height, Quetelet's body mass index, mid-arm muscle circumference, bone quality index (by bone densitometer QUS). Also, using formal method of diet: FFQ, dietary recall questionnaire. Data were assessed with SPSS25 statistical software. Significance level in these tests was obtained to be <0.05. Taking these factors were analyzed for all possible correlation of socioeconomic and family environment, age, gender, diet and food consumption, dietary habit. **Results:** The analysis showed that most children's food consumption and quality of diet were not enough compare to the recommendation. The obesity prevalence was high in children with mentally disabilities. One of diet related indicator is bone quality index, due to not enough consumption of main source of bone health; half of children's bone density is below

the standard range. **Conclusion:** The dietary intake of target children did not meet the local dietary guideline and bone quality index was low level (50%) in all children.

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Consumption, Nutrition Status and Metabolic Risk of Students from Highland Papua in Salatiga, Central Java

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Keywords: Eating habits · Physical activity · Anthropometry

Background/Aims: The student transition period due to urbanization affects their lifestyle and patterns. New environmental exposure supports their sedentary lifestyle. Adaptation changes characterized by an unhealthy diet and lack of physical activity put students at risk of nutritional problems and an increased metabolic risk in early adulthood. The study aimed to analyze the relationship between consumption habits, nutritional status, and metabolic risk in students from Highland Papua exposed to the new environment and lifestyle. **Methods:** Cross-sectional study with quantitative descriptive design was conducted from March to June 2017 in Salatiga, Central Java. The subjects were 31 students from Lani tribe Highland Papua. Data were analyzed using Pearson Test of body weight, height, waist circumference, hip circumference, BMI, RLPLP, total fat, frequency of food consumption, physical activity and indicators of clinical biochemical (blood pressure, gout, fasting blood glucose and cholesterol). **Results:** Pearson correlation test results showed that the frequency of consumption was associated with nutritional status (anthropometry) and clinical indicators. While physical activity was associated negatively with fasting blood glucose. **Conclusion:** Exposure to environmental aspects in relation to consumption and physical activity influenced the nutritional status and increased metabolic risk in Papua students.

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Plate Waste Assessment in Selected Food Establishments in the University of the Philippines Los Baños

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Keywords: Plate waste · Nutrition · Food service

Background/Aims: The attention on plate waste becomes relevant considering the global problem of food security, hunger, and malnutrition. But despite the growing concern on food and plate wastes, there is very limited local information with regards to the number of nutrients in every plate waste. The study aimed to describe the kind and amount of plate waste and assess its nutrition-

al content. **Methods:** Plate wastes were collected from three food-service establishments in the University of the Philippines Los Baños during lunchtime for four consecutive school days. The nutrient losses were determined using the Food Nutrition Research Institute Menu Evaluation Plus software. **Results:** On an average, it was observed that as a staple, a small amount of rice was wasted (21–38 grams), while low-fat meat viands ranging from 20–36 grams were left uneaten on plates. Approximately 8–53 grams of leafy and non-leafy vegetables and 27–150 grams of fruits were wasted during lunch meals. In terms of macronutrient and energy contents, approximately 2.6–12 grams of carbohydrates, 1.5–2.7 grams of protein, 1.7–4.8 grams of fat and 30–181 calories were wasted per plate per day during lunch. **Conclusion:** Creating more interesting vegetables and fruit dishes is recommended to minimize much waste and also utilize the needed micronutrients found in these kinds of food items.

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Android-Based Comics as a Nutrition Education Intervention to Improve Knowledge, Attitudes and Behavior on Fruits and Vegetables Consumption in Junior High School Adolescents in Kendari

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Keywords: Android-based comics · Nutrition education intervention · Fruits and vegetables consumption · Adolescent

Background/Aims: In 2017, *GERMAS* (Healthy People Movement) focuses on three main activities, one of that is improvement on fruits and vegetables consumption. Health Research Survey (*Riskesdas*) in 2010 stated that majority of Indonesian population do not consume enough fruits and vegetables, including among adolescents. One of efforts is through improvement of knowledge, attitudes and behavior on fruits and vegetables consumption by nutrition education intervention using comics. This study aimed to analyze the increasing of knowledge, attitudes and behavior on fruits and vegetables consumption in Junior High School students in Kendari City by android-based comics. **Methods:** This was a quasi-experimental study using pretest and post-test control group design. The study used 2 groups consisting of control group (nutrition education intervention without comics) and treatment group (nutrition education intervention using comics). **Results:** Before intervention, in control group, the proportion of subjects categorized as having sufficient knowledge was 89.5%, attitude 100% and behavior 89.5%; while in treatment group, the proportion of subjects categorized as having insufficient knowledge was 63.2%, attitude 63.2% and behavior 78.9%. After intervention, in control group, the proportion of subjects categorized as having sufficient knowledge was 94.7%, attitude 100% and behavior 89.5%; while in treatment group, the proportion of subjects categorized as having sufficient knowledge was 100%, attitude 89.5% and behavior 78.9%. **Conclusion:** Analysis of this study shows there was no differences of intervention without and using comics towards knowledge, attitudes and behavior of fruits and vegetables consumption among adolescents.

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Social Media and Adolescent Macro Nutrition Intake

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Keywords: Premenstrual syndrome · Snack food consumption · Physical activity · Young girl

Background/Aims: Anemia is a global problem, especially in developing countries. The aim of the research was to asses the effect of giving baruasa pigeon pea on hemoglobin level and cognitive of elementary school students suffering from anemia. **Methods:** The research was a quasi-experiment study using pretest-posttest design. The samples were selected using purposive sampling technique consisting of 60 students divided into three groups, i.e. baruasa pigeon pea+anthelmintic, baruasa group, and anthelmintic group. One week before intervention, the first group was given pyrantel pamoate anthelmintic with a dose of 10 ml. Then it was given intervention of baruasa pigeon pea 60 g/hr. The second group was given baruasa pigeon pea 60 g/hr, and the third group was pyrantel pamoate anthelmintic with a dose of 10 ml. The first and the second groups were given baruasa for 60 days. The measurement of Hb level and students was done one week before and one week after the implementation of intervension ends. Hb level was measured using hemocue, while cognitive was measured using standardized questions from local educational office. **Results:** The result of the research indicate that the percentage of average change of students Hb level and cognitive in baruasa + anthelmintic group is higher than the one in other treatment groups and they are different significantly.

1134
The Effect of Giving Baruasa Pigeon Pea on Cognitive of Elementary School Students

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Keywords: Baruasa pigeon pea · Cognitive · Elementary students

Background/Aims: Anemia in school children affects cognitive. The aim of the research was to asses the effect of giving baruasa pigeon pea on cognitive of elementary school students suffering from anemia. **Methods:** The research was a quasi-experiment study using pretest-posttest design. The samples were selected using purposive sampling technique consisting of 60 students divided into three groups, i.e. baruasa pigeon pea+anthelmintic, baruasa group, and anthelmintic group. One week before intervention, the first group was given pyrantel pamoate anthelmintic with a dose of 10 ml. Then it was given intervention of baruasa pigeon pea 60 g/hr. The second group was given baruasa pigeon pea 60 g/hr, and the third group was pyrantel pamoate anthelmintic with a dose of 10 ml. The first and the second groups were given baruasa for 60 days. The measurement of students was done one week before and one week after the imple-mentation of intervension ends. Cognitive was measured using standardized questions from local educational office. **Results:** The result of the research indicate that the percentage of average change of cognitive in baruasa + anthelmintic group and baruasa pigeon pea is higher than the one in other treatment groups.

1135
Food Suggestions, Meal Frequency and Dietary Diversity among Madurese Pregnant Women

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Keywords: Dietary diversity · Food suggestion · Pregnant women · Eating frequency

Background/Aims: Many nutritious foods are forbidden or suggested for pregnant women. During pregnancy, nutritional requiement increases therefore they should consume enough and nutritious food to get a healthy pregnancy. This study aimed to explore the association between food suggestion and meal frequency with dietary diversity of pregnant women. **Methods:** This study used mixed method (qualitative and quantitative). Qualitative data were collected by in-depth interview to 40 informants (pregnant women, pregnant women's family and traditional birth attendant). The design of this quantitative study was cross sectional and recruited 282 pregnant women in Madura Island, Indonesia. Dietary diversity was assessed by Minimum dietary diversity for Women (MDD-W). Spearman correlation and Coefficient contingency were done to analyze the association between variables. **Results:** There were 57.4% pregnant women had a food suggested. Foods suggestion for the pregnant women consisted of animal food, plant food, and drinks. The suggested animal foods were skipjack tuna/ "tongkol", milkfish, anchovy, tilapia fish, and eggs. The suggested vegetables were carrots, spinach, moringa leaves, water spinach, cabbage, while fruits were apples, oranges, bananas, and papaya. The suggested drinks were milk, coconut water and water. As many as 86.4% of the pregnant women ate 2–3x/day and 56% of pregnant women had a good dietary diversity (≥5 food groups). There was a significant association between dietary diversity with food suggestion (p = 0.0003) and meal frequency (p = 0.003). **Conclusion:** Pregnant women need to eat frequently and follow the food suggestions so they can have a good and diverse diet.

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Dietary Intake of B-Vitamins and The Risk of Having Offspring with Congenital Heart Diseases

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Keywords: Congenital heart diseases · Dietary · B-vitamins

Background/Aims: In addition to folate, epidemiological studies are limited on the relationship between other B-vitamins such as vitamin B_1, B_2, B_6, B_{12} and congenital heart diseases (CHD). In this study, we aimed to explore the association between maternal dietary intake of B-vitamins during pregnancy and neonatal CHD. **Methods:** A case-control study was conducted in 500 mothers of neonate with CHD and 1500 control mothers of a normal neonate in 6 hospitals in Xi'an, China. Through a face to face interview, the information of socio-demographic characteristic, prenatal B-vitamins supplementation, and environmental risk factors exposure were collected. A semi-quantitative Food Frequency Questionnaire was used to access dietary intake of mothers during pregnancy. Logistic regression was used to study the association between dietary intake of B-vitamins during pregnancy and CHD. **Results:** Case mothers had higher dietary intake of folate, vitamin B_1, vitamin B_2, vitamin B_6 and vitamin B_{12}. High dietary intake of folate (highest tertile vs. lowest tertile: OR = 0.31, 95% CI = 0.20–0.49; medium tertile vs. lowest tertile: OR = 0.57, 95% CI = 0.41–0.80), vitamin B_1 (highest tertile vs. lowest tertile: OR = 0.59, 95% CI = 0.36–0.96), vitamin B_2 (highest tertile vs. lowest tertile: OR = 0.40, 95% CI = 0.25–0.62; medium tertile vs. lowest tertile: OR = 0.65, 95% CI = 0.46–0.91), vitamin B_6 (highest tertile vs. lowest tertile: OR = 0.44, 95% CI = 0.28–0.70) and vitamin B_{12} (highest tertile vs. lowest tertile: OR = 0.41, 95% CI = 0.29–0.59; medium tertile vs. lowest tertile: OR = 0.49, 95% CI = 0.36–0.68) were associated with a lower risk of CHD. **Conclusion:** A maternal diet high in folate, vitamin B_1, vitamin B_2, vitamin B_6 and vitamin B_{12} during pregnancy seems to reduce CHD risk.

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Association between Socio-Demographic Factors and Dietary intake with Growth Status of Aboriginal Children Aged 7 to 12 Years at Labu, Negeri Sembilan

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Keywords: Dietary intake · Growth status · Aboriginal children

Background/Aims: Orang Asli is a minority population and the poorest ethnic compared to other ethnics in the Peninsular Malaysia. This study aimed to determine the association between socio-demographic factors and dietary energy intake with growth status of the aboriginal children. **Methods:** A cross-sectional study was conducted among 85 children at two aborigines' villages in Labu, Negeri Sembilan, Malaysia. A structured questionnaire was used to gather socio-demographic information. A 24-hour dietary recall was used to determine energy and macronutrients intake through Nutritionist Pro software analysis. The height and weight of the children were used to determine their growth status by converting the value into height-for-age (HAZ), BMI-for age (BAZ) and weight-for-age (WAZ) z-scores using WHO ANTHRO Plus software. **Results:** Most of the aboriginal children came from poor households (77% of the households were below Poverty Line Income of approximately USD180). The growth status of the children showed that 25.9% were stunted, 7.1% were overweight and 8.2% and 2.4% were found as underweight and severely underweight respectively. The results showed that majority of the respondents (65.9%) did not achieved Recommended Nutrient Intake of Malaysia. Pearson correlation test showed no significant association between socio-demographic factors and growth status of the children (p > 0.05). Significant association was observed between energy intake and WAZ (P < 0.05) but not on other z-scores. **Conclusion:** This study concluded that the aboriginal children have poor growth status and dietary intake. Steps should be taken to ensure optimum growth the aboriginal children thus ensuring better future for them.

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Risk Factors Associated with the Incidence of Anemia in Students of Palembang Health Polytechnic 2016

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Keywords: Iron · Protein · Vitamin C · Fiber · Tea · Nighttime sleep · Anemia level

Background/Aims: The purpose of this study was to find out the risk factors that associated with the incidence of anemia among students of Health Polytechnic Politeknik Palembang. **Methods:** The type of research used was analytical research with a cross sectional design. The population in this study were all first-level students as many as 560 people, while the study sample was 72 students that were selected based on criteria, taken proportionally stratified random sampling. The anemia data was obtained by respondent's venous blood collected by laboratory personnel. Retrieving data on tea drinking habits in a day was obtained through direct interviews using questionnaires. **Results:** Of the subjects, 59.7% suffered from anemia, 90.3% had insufficient iron intake, 87.5% had insufficient protein intake, 81.9% did not have enough vitamin C intake, all had insufficient fiber intake, 90.3% had insufficient nighttime sleep, and 93.1% had good tea drinking habits. There was no significant relationship between iron, vitamin C, and fiber intake, length of sleep at night, and tea drinking habits with anemia in students of (p > 0.05). Protein intake was associated with anemia (p < 0.05). **Conclusion:** Considering the high prevalence of anemia and its related iron deficiency, iron supplementation is recommended.

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Effects of Health Education using Lunch and Diet Education Media in Employee Canteen for Japanese Workers

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Keywords: Japanese worker · Lunch ·Table top memo ·Employee canteen

Background/Aims: Japanese workers have opportunities to be educated on health using lunch menus based on Dietary Reference Intakes for Japanese in the workplace and health education by diet education media. The purpose of this study was to clarify whether health education utilized lunch and table top memos for Japanese workers improved food and nutrient intake. **Methods:** We conducted a survey of 150 employees who usually ate the catering in the employee canteen of one company by interventional before-after study of single arm. We analyzed 77 subjects (67 males, 10 females) who participated in all survey. Diet intake were studied using a brief-type self-administered diet history questionnaire (BDHQ). The results of BDHQ showed high salt intake. Thus we educated workers using salt reduction lunch and table top memo in the employee canteen for one month. Wilcoxon's signed rank sum test was used for the test of the difference of average values, and the significance level was 5%. The protocol of the present study was approved by the Ethics Committee of Kinjo Gakuin University (No.H15013). **Results:** Carbohydrate, fiber, rice, miso soup and Japanese traditional sweets intake after education were decreasing from before education. Japanese workers changed diet and nutrition by doing diet education using lunch and desk notes. However, there was no change in targeted nutrients. **Conclusion:** There was an opportunity on the use of lunch table top memos in the workplace to improve diet of employees.

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Development, Validity and Reliability of Healthy Meal Preparation Questionnaire among Primary School Children in Kuala Lumpur, Malaysia

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Keywords: Healthy meal preparation · Questionnaire · Reliability · Validity

Background/Aims: Children's psychosocial factors towards healthy meal preparation are important for sustainable nutrition-related behavior. With lack of tool to measure such factors, this cross-sectional study aimed to validate and determine the reliability of a questionnaire that measures psychosocial factors (knowledge, attitude, practice, self-efficacy) towards healthy meal preparation among Malaysian children. **Methods:** The questionnaire

was tested for face and content validity. Subsequently, stratified random sampling was used to select primary schools in Kuala Lumpur zones. Altogether, 250 schoolchildren aged 9–11 participated. A subsample of 100 children completed the questionnaire again after a 2-week interval for test-retest reliability. Item analysis was conducted for knowledge domain. Construct validity of attitude, practice and self-efficacy domain was assessed using exploratory factor analysis with principal axis factoring extraction and direct oblimin rotation. Cronbach's alpha coefficient and Kuder-Richardson Formula 20 assessed internal consistency; intraclass correlation coefficient assessed test-retest reliability. **Results:** Experts panel rated the questionnaire with >0.75 validity index. Knowledge domain had optimal level of difficulty (difficulty index = 0.48–0.78) and was able to discriminate (discrimination index = 0.22–0.46) between children with top and low score. Three factor-solutions emerged for attitude domain and two-factor solutions emerged for practice and self-efficacy domains, with appropriate factor loadings (>0.40). Internal consistency ranged from 0.63–0.75 for respective domains and overall internal consistency of 0.82 for the whole questionnaire. Intraclass correlation coefficient ranged from 0.85–0.89 for respective domains. **Conclusion:** The questionnaire is reliable, valid and may be adapted for the use of hands-on healthy meal preparation interventions to advocate healthy dietary behavior in children.

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Effects of Balanced Nutrition Guidelines (PGS) Information Dissemination using Video on Adolescents' Knowledge and Behavior at Pleret Village, Bantul, Yogyakarta

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Keywords: Balanced nutrition guidelines · Adolescent · Knowledge · Behavior

Background/Aims: Health Research Survey (*Riskesdas*) on 2013 mentioned that about 18.8% adolescent in Indonesia were obese and about 11.2% were underweight. This can affect the quality of human resources, which can result in the loss of the younger generation and impact the nation's economic condition in the future. Adolescent who have good nutrition knowledge will be able to select foods according to their needs and to follow Balanced Nutrition Guidelines (*PGS*). This study aimed to assess the effect of *PGS* information dissemination using video and on adolescents' knowledge and behavior. **Methods:** This was qualitative and quantitative study conducted in Pleret Village, Bantul, Yogyakarta on 2016. About 10 informants and 30 respondents were selected by purposive sampling technique. Quantitative data were analyzed using paired t-test statistic test with a = 0.05. Information dissemination were conducted by the informants themselves through discussion to their family, youth organization mates, school mates, and village policy makers. It took places in their houses, organization meeting, mosque, and school. **Results:** The mean score of their knowledge on PGS before and after the education were 13.20 and 16.50, respectively. The mean score of their behavior on PGS

before and after the education were 16.27 and 22.43, respectively. Education of PGS using video was more effective to increase knowledge and improve behavior of PGS (p < 0.05). **Conclusion:** Nutrition education using video improved knowledge and behaviour among adolescents.

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Difference in Complementary Foods Timeliness and Consumption Pattern between Stunting and Non-Stunting Children Aged 12–24 Months in Manado City

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Keywords: Complementary foods · Timeliness · Stunting

Background/Aims: Malnourished children at the age of under two years can have growth faltering and stunting. The feeding of complementary foods should be considered the timely, frequency, form, portions, and the type of administration. This study aimed to compare the timeliness of administration and consumption patterns of complementary feeding in stunting and non-stunting children in Manado City. **Methods:** This study was a retrospective analytic study with a case study design. The population in this study were children aged 12–24 months who lived in the city of Manado, the samples in this study were 39 children for the stunting group and 40 children for the non-stunting group. Stunting children was identified by measuring the child's body height/length in 5 Primary Health Center Areas in Manado City. The research data was obtained using questionnaire including Food Frequency Questionnaire which was filled out by respondents (parents of children) and anthropometric data obtained through measurements of the child's body height/length. **Results:** There was no statistically significant difference between the timeliness of the stunting group of children compared to non-stunting children (p = 0.956). Also, there was no difference in the frequency of macronutrient consumption in the two groups (p = 0.643). There were significant differences in the ingredients of complementary foods menu composition between stunting and non-stunting children, i.e. potatoes (p = 0.025), corn (p = 0.005), and broccoli (p = 0.005). **Conclusion:** Ingredients of complementary foods composition was different between stunting and non-stunting children.

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Awareness on Healthy Foods among Firefighters in Taiwan

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Keywords: Healthy food · Firefighter · Self-perceived health

Background/Aims: The objective of the study was to understand consumption situation of firefighters in Taiwan, to characterize those who took healthy food and the relationship among regulation awareness, the acceptability of healthy foods, work stress, and occupational injuries. **Methods:** Assessment on the healthy food awareness, the acceptability of healthy food, work stress, and occupational injuries used questionnaire. The total quantity of effective questionnaire retrieved was 177. **Results:** The study indicated that about 52.5% of firefighters in Taiwan reported taking healthy food. The characteristics of the consumers in firefighters were middle age (31~40 years old), married and higher scores in exercise habits, health food product awareness, and self-perceived health. The correlation of awareness of healthy food and self-perceived health for healthy food and non-healthy food consumers were both significant differences (p < 0.05). The higher the cognition of health food products, the higher the prediction of its influence on self-perceived health. **Conclusion:** Health food product awareness has a significant impact on health food supplementing habits and self-perceived health.

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Correlation between Maternal Nutrition Status and Birth Outcome from a Cohort Study in Semi Urban Area of Bogor, Indonesia

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Keywords: Maternal Nutritional status · Birth weight · Birth length · Birth outcomes

Background/Aims: Low birth weight and short birth length are still prevalent in Indonesia. Maternal nutritional status before conception and during pregnancy determines the quality of birth outcome. The study aimed to analyze the correlation between maternal nutrition status and birth outcome in semi urban area. **Methods:** For this purpose, a prospective cohort study was applied for 76 healthy pregnant women (PW) in semi-urban area of Bogor, West Java, Indonesia. Data collected include age, age of pregnancy, education level, body weight before pregnancy, at the beginning and at the end of the study, and mid-upper arm circumference (MUAC) of PW. Hemoglobin (Hb) concentration was measured using Hemocue. Birth weight and birth length were measured using standard procedure. **Results:** The results showed that 3.8% and 23.1% of new born infants was low birth weight and short length, respectively. The mean age, pregnancy age, MUAC and Hb of PW were 28.7 ± 6.6 years old, 20.4 ± 7.6 weeks, 27.5 ± 3.6 cm, and 11.2 ± 1.0 g/dL, respectively. There were 26.3% PW categorized as high-risk age for pregnancy. The statistical analysis showed that there was no correlation exist between all pregnancy characteristics and birth weight, and also birth length. Birth weight and birth length were significantly correlated (p < 0.05). **Conclusion:** Birth weight and birth length of babies were not significantly correlated with maternal characteristics.

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Body Fat and Energy Intake of Normal and Obese Women Aged 18–39 Years Old in Karawang District

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Keywords: Body fat · Energy intake · Obese women
Background/Aims: The objective of the study was to assess body fat percentage and energy intake of women in Karawang district. **Methods:** The study was part of a bigger study assessing the nutrient density between normal and obese women in Karawang district. The subjects were women aged 18–39 years old (n = 51 normal and n = 50 obese) recruited using convenience sampling. Normal was defined as those with BMI 18.5 <25 kg/m^2; while obese was BMI ≥30 kg/m^2. Body composition was measured using TANITA DC-360P and height using SECA No. 213. A one day 24-hr recall was employed to assess energy and nutrient intake. **Results:** All women in obese group had body fat percentage ≥ 39%; while 55% of women in normal group had body fat percentage ≥ 33%. Women in normal group had significantly higher percentage of muscle mass than those in obese group (63.3 ± 3.7 vs. 48.8 ± 3.6%, p < 0.01). The total energy intake was not significantly different between groups (mean±SD: 1825 ± 639 kcal); but obese group had significantly lower energy intake from protein (12.1 ± 3.4 vs. 14.0 ± 3.4% energy, p < 0.01) and higher energy intake from carbohydrate (61.2 ± 11.5 vs. 56.5 ± 11.6% energy, p < 0.05). The obese group had significantly higher percentage who did not meet the Acceptable Macronutrient Distribution Range (AMDR) than the normal group (70 vs. 43.1%, p < 0.05). Majority of women with normal BMI level had body fat percentage higher than ideal indicating an obesity. **Conclusion:** Normal and obese women are encouraged to meet the AMDR of energy intake.

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The Influence of Nutrition Education through Nutriboard Game on Knowledge and Balanced Nutrition Attitude in 5th Grade Elementary School Students

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Keywords: Balanced nutrition · Media education · Nutriboard game · Nutrition education
Background/Aims: Low level of nutritional knowledge and practice about balance nutrition among school aged children are mainly due to lack of nutrition education at school. Innovation of educational media tools can make learning process becoming easier to understand. Board games is one of the tools that can be used. The aim of this study was to determine the effect of the nutrition education using nutriboard game on changes in knowledge and attitudes about balanced nutrition in 5th grade elementary school students. **Methods:** The Quasi Experimental method with non-randomized control group and pretest-posttest design was used in this study with 65 5th grader students in SDN Sukasari 6 Tangerang. They were evenly divided between the control group and the intervention group. **Results:** Most of the samples were 10 years old, 82.1% in the control group and 85.7% in the intervention group. There were no differences in knowledge scores of the two groups when post-test 1 with a value of p > 0.05 and there was a difference in knowledge scores at post-test 2 with a value of p < 0.05. There were no differences in attitude scores of the two groups during post-test 1 and post-test 2 with p > 0.05, but there was an increase in the two groups. **Conclusion:** Nutrition education through nutriboard game can change knowledge and attitude about balanced nutrition in 5th grade elementary school students.

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Predictors of Breastfeeding Self-Efficacy among Expectant Mothers in Selangor

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Keywords: Breastfeeding self-efficacy · Breastfeeding knowledge · Theory Plan of Behaviour · Expectant mothers
Background/Aims: Numerous short and long term benefits of breastfeeding have been documented for both infants and mothers. Breastfeeding self-efficacy refers to how mother's ability to breastfeed to their newborns. Mothers who have higher self-efficacy or breastfeeding control are more likely to intend to breastfeed, initiate early and have longer duration of breastfeeding exclusivity. There are various independents variables that can affect maternal breastfeeding self-efficacy; modifiable and non-modifiable factors. In Theory of Plan Behaviour, attitude, subjective norm, perceived behavioural control influence mother's breastfeeding confidence and directly impact intention and behaviour. Therefore, the purpose of this study is to assess the level of breastfeeding self-efficacy and to determine the predictors of breastfeeding self-efficacy among expectant mothers in order to improve the breastfeeding rate in Malaysia. **Methods:** This study is a cross-sectional and mothers were recruited from selected Maternal and Child Health Clinics in Selangor. Iowa Infant Feeding Attitude Score (IIFAS) and Breastfeeding Self-Efficacy (BSES-SF) questionnaires were used to obtain data on breastfeeding knowledge, attitude and self-efficacy. **Results:** Findings from this study showed participants had higher level of breastfeeding self-efficacy (mean = 51.79) and majority of them had moderate knowledge in breastfeeding. Parity was found associated with breastfeeding self-efficacy (p = 0.002), meanwhile, area of residency, employment and household income were associated with breastfeeding knowledge (p < 0.05). Predictors of breastfeeding self-efficacy among expectant mother were parity, maternal employment and breastfeeding knowledge

(p < 0.05). **Conclusion:** In conclusion, this study support the Theory of Planned Behavior where knowledge and breastfeeding experience influenced breastfeeding intention.

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Self-Efficacy in Consuming Chicken Liver, Egg, and Fish (Atika), Iron Adequacy and Hemoglobin Level among Female Adolescents in Lamongan District, Indonesia

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Keywords: Anemia · Female adolescent · Self-efficacy · Iron adequacy

Background/Aims: Anemia among female adolescent is considered as one of risk factor for stunting incidence in their offspring. This research was aimed to assess effect of self-efficacy to consume chicken liver, egg, and fish (ATIKA) to iron adequacy and hemoglobin level of female adolescents. **Methods:** This was cross sectional study involving 125 female high-school students in Lamongan District. Hemoglobin level was assessed using Quick-Check hemoglobin meter (Acon Laboratories Inc.). Self-efficacy was determined using 10 questions related to confidence to overcome barriers and 8 questions related to capacity in performing task to consume ATIKA. Iron adequacy was measured from non-consecutive 2 x 24-our food records. Statistical analysis used were Pearson, partial correlation, and linear regression. **Results:** The prevalence of anemia among female students was 12% with only 10.4% of the total samples had adequate iron intake (≥77% RDA). This indicated that most of female students were still at risk in experiencing anemia in the future. Mean of self-efficacy score was medium (46.94 ± 21.39 for barrier and 52.82 ± 22.57 for task completion variable). Self-efficacy in consuming ATIKA did not perform significant effect on iron adequacy (p = 0.513). However, self-efficacy to eat fish had significant correlation with hemoglobin level (p = 0.048), even after controlling for iron adequacy variables (p = 0.05). **Conclusion:** Self-efficacy to eat ATIKA as well as iron intake among adolescents was still insufficient. Efforts for anemia prevention should target not only access and availability of iron rich food but also female adolescent's self-efficacy.

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Problem Nutrients Identified Using Linear Programming in Underfive Children and Pregnant Mothers in 10 Stunting Prioritized Districts in Indonesia

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Keywords: Food-based recommendation · Linear programming · Problem nutrients · Stunting

Background/Aims: Stunting and anemia amongst mothers and young children are attributable to poor nutrient intakes. The aim of the study was to identify problem nutrients in underfive children and pregnant mothers in 10 stunting prioritized districts in Indonesia. **Methods:** Linear programming analysis (LP) using Optifood was used based on dietary data collected using single 24-hour dietary recall in Pemantauan Konsumsi Gizi conducted by Ministry of Health from 10 stunting prioritized districts in Indonesia. Problem nutrient was defined as nutrient which did not meet 100% Recommended Nutrient Intake (RNI) based on FAO-RNI in the 2-best-diets (Module-2 Optifood). **Results:** Amongst underfive children, top three problem nutrients were folate (27/40 age-site groups), zinc (24/40 age-site groups) and iron (13/40 age-site groups). The number of problem nutrients ranged from zero (for 24–25 mo in Brebes, Cianjur, Pemalang; 36–59 mo in Cianjur, Pemalang) to six nutrients (for 6–11 mo in Lampung Tengah, Rokan Hulu). Amongst pregnant mothers, top three problem nutrients were iron (8/10 sites), folate (5/10 sites), iron and calcium (2/10 sites). The number of problem nutrients ranged from one (in Pemalang) to six nutrients (in Lanny Jaya). The findings showed that problem nutrients identified using LP was in line with nutritional problems in underfive children (stunting and anemia) and pregnant mothers (anemia). **Conclusion:** Food-based recommendations which promoted nutrient-dense foods suited to the problem nutrients in each area need to be promoted and are expected to more effectively improve feeding practice of underfive children and dietary practice of pregnant mothers.

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Nutritional Knowledge Differences of Bride and Groom Community in West Jakarta

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Keywords: Bride · Groom · Balance nutrition · Pregnancy

Background/Aims: Based on the 2015–2030 Sustainable Development Goals (SDGs), there are various world development

goals that want to be achieved together such as eradicating hunger, improving nutrition, and improving the health of all people – including bride and groom. They need to be considered as the nutrition-related research subjects because of their pivot role in building a healthy and quality family. **Methods:** A cross-sectional design involving 246 brides and grooms in the Religious Affairs Office (KUA) Kebon Jeruk, Palmerah, and Kembangan, West Jakarta. The variables studied included socioeconomic characteristics and nutritional knowledge (balance nutrition and pregnancy). All of the bride and groom in this study have poor knowledge of nutrition. **Results:** There were significant differences in all knowledge variables based on education level and income level (p < 0.05). The lower their education level and income, the lower nutritional knowledge. In addition, the bivariate analysis showed that there were differences in pregnancy knowledge between bride and groom (p = 0.002). The bride has better knowledge about pregnancy but their knowledge was on the lowest level. **Conclusion:** The bride and groom have a low level of nutrition knowledge that correlated positively with their education level and income. Then, nutrition education, including balance nutrition and pregnancy knowledge, is needed to improve their knowledge.

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Differences in IQ Levels of Elementary School Children Based on Prevalence of Stunting

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Keywords: Stunting prevalence · IQ levels · Elementary school students

Background/Aims: The purpose of this study was to analyze the differences in IQ levels of elementary school children based on stunting. **Methods:** This cross-sectional study involved 50 elementary school children taken by purposive sampling technique. The data of prevalence stunting were taken by measuring height for age, and the data of children's IQ level were taken by Wechsler Intelligence Scale for Children (WISC) method. The data then were analyzed by using independent samples t-test. **Results:** The children's average age was in the range of 7.8 + 0.9 years old, children's average weight was in the range of 19.8 + 4.3 kg, and children's average height was in the range of 116.7 + 7.1 cm. In addition, 24 (48%) children were categorized into stunting group, and 26 (52%) students were categorized into non-stunting group. In the stunting group, the average of children's IQ level was 79.3 + 14.7. In the non-stunting group, the average of children's IQ was 81.4 + 12.5. **Conclusion:** There were no differences in IQ levels between stunting group and non-stunting group children.

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Relationship of Body Mass index, Waist Circumferences, and Percent Fat Body with Lipid Profile and Oxidative Stress Markers in Menopausal Women

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Keywords: Body mass index · Lipid profile · Menopausal women · Oxidative stress

Background/Aims: The prevalence of degenerative diseases in menopausal age women has reached 54% in 2013 and continues to increase every year. This study aimed to analyze the relationship of body mass index, waist circumference, percent body fat with lipid profile and oxidative stress markers in menopausal women. **Methods:** This research used total subjects 8 menopausal age women in Ciherang village, Dramaga sub-district, Bogor, West Java, Indonesia. Data analysis was using Microsoft Excel and SPSS 23 software. **Results:** The age of the subject was 57 ± 4.6 years (range 50–60 years). The mean BMI was 27.5 ± 2.1 kg/m^2. The mean waist circumference was 90.8 ± 7.2 cm, and percent body fat was 35.6 ± 3.3%. The mean cholesterol, TG, HDL and LDL levels respectively were 186.4 mg/dl, 119.8 mg/dl, 55.5 mg/dl and 107 mg/dl. The average MDA and SOD were 155.5 ng/ml and 27.55 U/ml. **Conclusion:** There was a significant positive correlation between body mass index and body fat percent, cholesterol level, serum LDL and serum MDA levels; and significant negative correlation between body mass index and body fat percent with serum SOD levels.

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Investigation on Nutritional Knowledge-Attitude-Practice among Students in Six Cities of China

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Keywords: Nutritional knowledge · Nutritional attitude · Dietary behavior · Students

Background/Aims: Children are at a critical stage of growth and development. Nutritional knowledge and attitude have effects on dietary behavior. The study was to investigate the status on nutritional K-A-P among students in six cities of China. **Methods:** A total of 12,197 students were selected from 72 elementary schools by multi-stage stratified cluster random sampling. A self-administrated questionnaire was used to assess K-A-P. **Results:** Their nutritional knowledge was poor (12.03 ± 6.43; 60.1%) and practice was moderate (11.42 ± 2.37; 76.1%), though their nutritional attitude was positive (16.98 ± 2.40; 84.9%). The nutritional K-A-P scores of girls were higher than those of boys; the nutritional knowledge and attitude scores of urban students were higher than those of suburban students; the nutritional knowledge score of

fifth-grade students was higher than that of fourth-grade students (P < 0.01). Most students knew nutrition for whole grains (73.9%) and importance of nutrition (97.6%). Most students ate breakfast almost every day (88.5%), nevertheless most students hardly ate snacks (34.9%), fast food (38.0%) and drinks (48.3%). Girls and suburban students ate breakfast more often whereas girls and fifth-grade students ate snacks and fast food less often. Suburban and fifth-grade students had drinks less often (P < 0.01). The score of students' nutritional knowledge was positively correlated to attitude, so as attitude and practice (r = 0.287, 0.132, P < 0.01). **Conclusion:** Students lacked nutritional knowledge and had unhealthy dietary-behavior. Nutritional K-A-P were relevant. Therefore, more nutrition health education should be carried out.

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Prevalence and Influencing Factors of Obesity among Elementary School Children in Periurban Area

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Keywords: Elementary · Fat · Obesity · Prevalence
Background/Aims: This study aimed to obtain an overview of the level of obesity and to study the lifestyle, especially diet and physical activity, of school children in villages near to Bandar Lampung City of Lampung Province of Indonesia. **Methods:** This study was conducted by a cross sectional survey method in a village <20 km from Bandar Lampung. There were 70 elementary students who have received consent from their parents to voluntarily participated in the study. The research data included anthropometry, diet and nutrient intake and student activities were collected in September to October 2017 and analyzed by different tests, correlations and regression analysis. The nutritional status of students was grouped into thin, normal, overweight and obese based on mass index body (BMI) according to age. **Results:** The prevalence of overweight was 8.6%, and of obese 12.9%. The eating frequency was not significantly different in all types of food groups. There were significant differences on macro nutrient intake, physical activity, duration of sleeping and active movement among children who were thin, normal, overweight and obese. **Conclusion:** Obesity in elementary school students was influenced by energy intake and duration of sleep.

1155
Food Preparation and Decision Process, Who Are the Gatekeepers? A Study on the Involvement of Domestic Helper(s) in the Malaysian Chinese Families

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Keywords: Eating Habits, Food preparation process, Eating decisions, Malaysian Chinese, Domestic helper
Background/Aims: Nowadays society is changing, more women are found in the work force making it harder to balance work and family life, one of the ways to overcome this issue is by getting a domestic helper. When a domestic helper joins the household she might or might not contribute to some of the decisions related to eating habits, food preparation process and eating decisions, and the change of the gatekeeper roles, the objectives of this research is to understand if the presences of domestic helper in Malaysian Chinese middle class families, will change these roles and decisions making process. Nutritionists have been interested in knowing the main gatekeeper in a family as it can help with targeting the right person when conducting nutrition campaigns; furthermore, experts from the food industry consider that the domestic helper's topic is still a taboo in the Malaysian society and researching it can help understand their contribution in a family. **Methods:** The methodology used is qualitative, in total 14 semi structured interviews were conducted, the sample was chosen by using purposiveness followed by snowball sampling. Interviews were recorded and transcript and then analysed using thematic analysis method. **Results:** The main findings showed that the domestic helper's presence in the Malaysian Chinese middle class families does contribute to the execution and decisions when it comes to eating habits, food preparation process and eating decisions mainly as an executer, it doesn't change the role of the gatekeeper as it is still maintained by the wife. Future research in sociology and anthropology might look into conducting same questions and objectives applied to other races to further help in understanding the implication of domestic helpers in Malaysian society.

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PDSA (Plan-Do-Study-Act) Nutrition Education and Counseling at Dr. Cipto Mangunkusumo Hospital in 2015–2017

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Keywords: Nutrition · Education · Counseling · PDSA
Background/Aims: Nutrition education and counseling are nutritionist core competency which was delivered to the patients with risk of malnutrition. The research objective was to assess the implementation of hospital nutrition service guideline in 2015–2017 following the standard of accreditation and to describe trend of key performance indicator (KPI) achievement in nutrition ed-

ucation and counseling. **Methods:** Descriptive study was performed by observation in 2015–2017 from primary and secondary data. **Results:** Plan: In 2016 KPI reached 75% from the 90% target. It was an increase of 11% from previous year. Skill and nutritionist capability were the main obstacles, therefore it was necessary to create standardized training curriculum and module in collaboration with Ministry of Health. Do: Using 5W & 1H questions on nutrition education indicators based on standardized curriculum and module from the Ministry of Health, it was recommended to perform training for new nutritionists. The results were monitored in the first semester of 2017. Study: Results of the 2017 first semester monitoring showed that training to new nutritionists increased the KPI to 92.5%, higher than the recommended target (90%). The KPI in 2015 was 64% (from 13,746 patients), in 2016 75% (19,476 patients) and in 2017 92.5% (21,458 patients). Act: Nutrition education KPI has increased more than the recommended target. **Conclusion:** Continuing training and workshop are the main answer for improving nutritionists' skill and ability that impacted the nutrition education as their core competency.

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Elaidic Acid Develops Arteriosclerosis via TLR4 Signaling System

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Keywords: Elaidic acid · Arteriosclerosis · TLR4 · Signaling system

Background/Aims: Intake of trans fatty acids formed in the process of industrial hydrogenation of fats has been reported to increase the risk of arteriosclerosis and cardiovascular disease, which is the leading cause of death worldwide. However, there are many unclear points about the detailed mechanism of action of trans fatty acids in the disease onset process. **Methods:** We analyzed the effects of elaidic acid, which is a major component of industrial trans fatty acids, on adipocytokine expression and macrophage differentiation. **Results:** The expression of TNF-α was found to be elevated in human breast cancer-derived YMB cells and PMA-stimulated human monocyte-derived U937 cells by real-time PCR. TNF-α protein inhibited the expression of an anti-arteriosclerotic adipocytokine adiponectin in YMB cells. Several inhibitors of TNF-α signalling system and knockdown of TNF-α expression by siRNA recovered the expression of adiponectin. In PMA-stimulated U937 cells, elaidic acid increased the expression of the TLR4 co-receptor CD14, ICAM-1 and both differentiation markers CD68 and CD147, and also promoted phagocytosis. These results and TNF-α expression were significantly inhibited by a TLR4 inhibitor TAK-242. In addition, inhibition of adiponectin expression by elaidic acid was not observed in primary cultured fat cells from TLR4-deficient mice. These facts suggest that elaidic acid inhibits the expression of adiponectin and in parallel promotes the differentiation of monocyte macrophages, phagocytosis and macro-

phage foaming through the TLR4 signalling system which causes arteriosclerosis. **Conclusion:** There is close relationship between elaidic acid and arteriosclerosis.

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Effectiveness of ICT (Information and Communications Technologies) Based Mobile Chatbot Program for Reducing Dietary Sugar Intake in Female College Students

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Keywords: Dietary sugar reducing · ICT based chatbot · Dietary behavior · Nutrition knowledge

Background/Aims: A high level of dietary sugar intake is of concern because of its association with poor dietary quality, obesity, and risk of Noncommunicable diseases. The ICT-based healthcare has been increasingly perceived to be an effective way for the dietary assessment and monitoring. This study was conducted to develop a ICT based reducing dietary sugar intake mobile chatbot program and to verify the effects of the program. **Methods:** This program was developed using a ICT-based mobile chatbot which can monitor dietary sugar intake after recording dietary intake and provide education message on the reduction of dietary sugar intake. In a two-month pre–post intervention study, 68 female college students were instructed to record all foods consumed daily and received weekly education information for the reduction of sugar intake. At pre-post intervention, participants were asked to answer the questionnaire about sugar-related nutrition knowledge, dietary behavior and sugar intake frequency. For statistical analysis, descriptive statistics was performed; a paired t-test were used for comparative analysis. **Results:** After two-monthly pre-post intervention, the subjects showed statistically significantly higher scores for sugar-related nutrition knowledge (t = –7.29, p < 0.001) and behavior (t = –7.42, p < 0.001). By FFQ(Food Frequency Questionnaire) for sugar intake analysis, intake of marinated meat(p = 0.044), biscuits(p = 0.008) sports drinks(p = 0.045), chocolate(p = 0.005), cream bread(p = 0.021), muffins or cakes(p = 0.014) and drinking yogurt(p = 0.007) was shown to be lower than pre-intervention status. **Conclusion:** The results of this study indicate that a ICT based reducing dietary sugar intake mobile chatbot program can be used as a useful educational tool for the reducing dietary sugar intake.

Poster Presentation

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Strengthening Indonesia's Nutrition through Primary Health Care: A Case Study of *Pencerah Nusantara*

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Keywords: Pencerah Nusantara · Puskesmas · Posyandu · Nutrition

Background/Aims: With 9,767 *Puskesmas* across Indonesia, Public Health Centers (*Puskesmas*) has a strategic role to improve nutrition at the grassroots level. *Pencerah Nusantara* program has a mission to strengthening the delivery of nutrition services through the health system including *Puskesmas* and Integrated health posts (*Posyandu*) in 8 selected districts across Indonesia. As *Puskesmas* staff deliver technical supervision and visit *Posyandu* regularly, increasing *Puskesmas* staff capacity on nutrition will contribute to improving *Posyandu* outcomes and nutritional status of children and pregnant women. The study aimed to evaluate *Pencerah Nusantara* Program on improving nutrition status through strengthening *Puskesmas*. **Methods:** The study was conducted with a pre-post evaluation method using data from program quarterly report during April 2015 to December 2018. **Results:** *Pencerah Nusantara*'s *Puskesmas* had a higher level of accreditation score compared to neighboring *Puskesmas*. Quality of *Puskesmas* management was increased from 45% to 75% after three years of intervention program. The prevalence of malnutrition reduced by 0.1%. During intervention period, *Pencerah Nusantara* conducted 102 trainings to *Puskesmas*' nutrition officer and 72 trainings targeted to *Posyandu* cadres. At the end of intervention, *Posyandu* visitation rate increased from 78 to 82%. Further, the *Pencerah Nusantara* advocated for village fund allocation for *Posyandu* and health facilities. As a result, 8 deployments budgeted their village funds for health program. **Conclusion:** Strengthening *Puskesmas* and *Posyandu* through *Pencerah Nusantara* has contributed to nutritional status improvement.

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Relationship between Iodine Status and Iodine Knowledge in Young Chinese Adults

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Keywords: Iodine · Adults · Intake · Food

Background/Aims: There is a lack of information about the iodine knowledge level and iodine intake level in Chinese adult populations. The aim of this study was to explore the relationship between iodine knowledge and iodine intake level in adults living in Suzhou, China. **Methods:** A cross-sectional study was conducted among 150 Chinese university students in 2018 in Suzhou. Iodine knowledge level was assessed by iodine knowledge questionnaires and iodine intake level was collected through food frequency questionnaires (FFQ). **Results:** The results showed high iodine knowledge level and iodine intake level among Chinese university students and found iodine knowledge level was not associated with iodine intake level. **Conclusion:** This study indicated that Suzhou university students have a sufficient iodine intake. It is recommended for future studies to target on the general Suzhou population to explore their iodine knowledge and iodine intake level.

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